

BBC

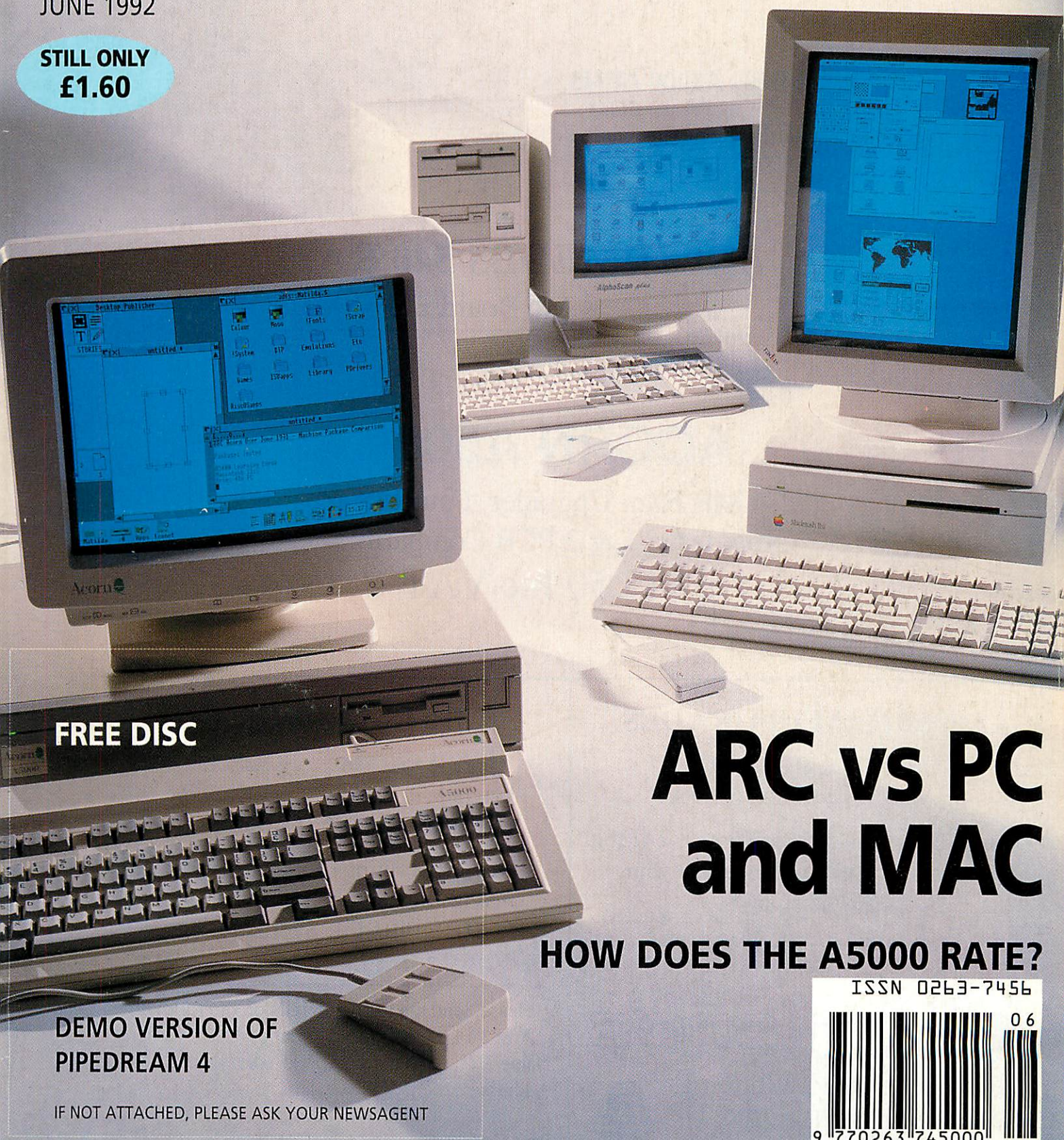
A3000 • A5000 • ARCHIMEDES • BBC •

THE BEST
SELLING ACORN
COMPUTER MAGAZINE

ACORN USER

JUNE 1992

STILL ONLY
£1.60



FREE DISC

DEMO VERSION OF
PIPEDREAM 4

IF NOT ATTACHED, PLEASE ASK YOUR NEWSAGENT

ARC vs PC and MAC

HOW DOES THE A5000 RATE?

ISSN 0263-7456



CLASSIC BBC PROGRAMS • NEW PC CARD • GAMES

ARM 3's

£ 169 + VAT

ARCHIMEDES ARM3

For 3/400 Series
User fittable
MEMC1a required
on 310 & 440
£ 40 + vat Extra

BBC A3000 ARM3

require dealer fitting

Fitting (inc courier collection and return) £ 41.13 inc VAT

**NEW Lower
Price**

ARCHIMEDES 540 RAM UPGRADES

4 Mb Board £ 295.00 inc VAT

ACORN A5000

2-4 MB Ram Upgrades, Four Layer
Now Issue 1 & 2 PCB Compatible
£ 117.50 Inc VAT

**NEW
Version**

A3000 RAM UPGRADES

2nd Mb £59.00 inc VAT
4th Mb £160.00 inc VAT

Our 4Mb expansion board uses 8 x 4Mbit
chips which will not overload your
power supply.

310 RAM UPGRADES

Upgrade to 2 Mb £ 200.00 inc VAT
Upgrade to 4 Mb £ 300.00 inc VAT
Upgrade 2 to 4 Mb £ 140.00 inc VAT

Includes fitting of the upgrade, courier
collection and return of your computer.

THE FIRST & STILL THE BEST

CEmicro's

78 Brighton Road, Worthing,
West Sussex. BN11 2EN.
Telephone 0903 213361



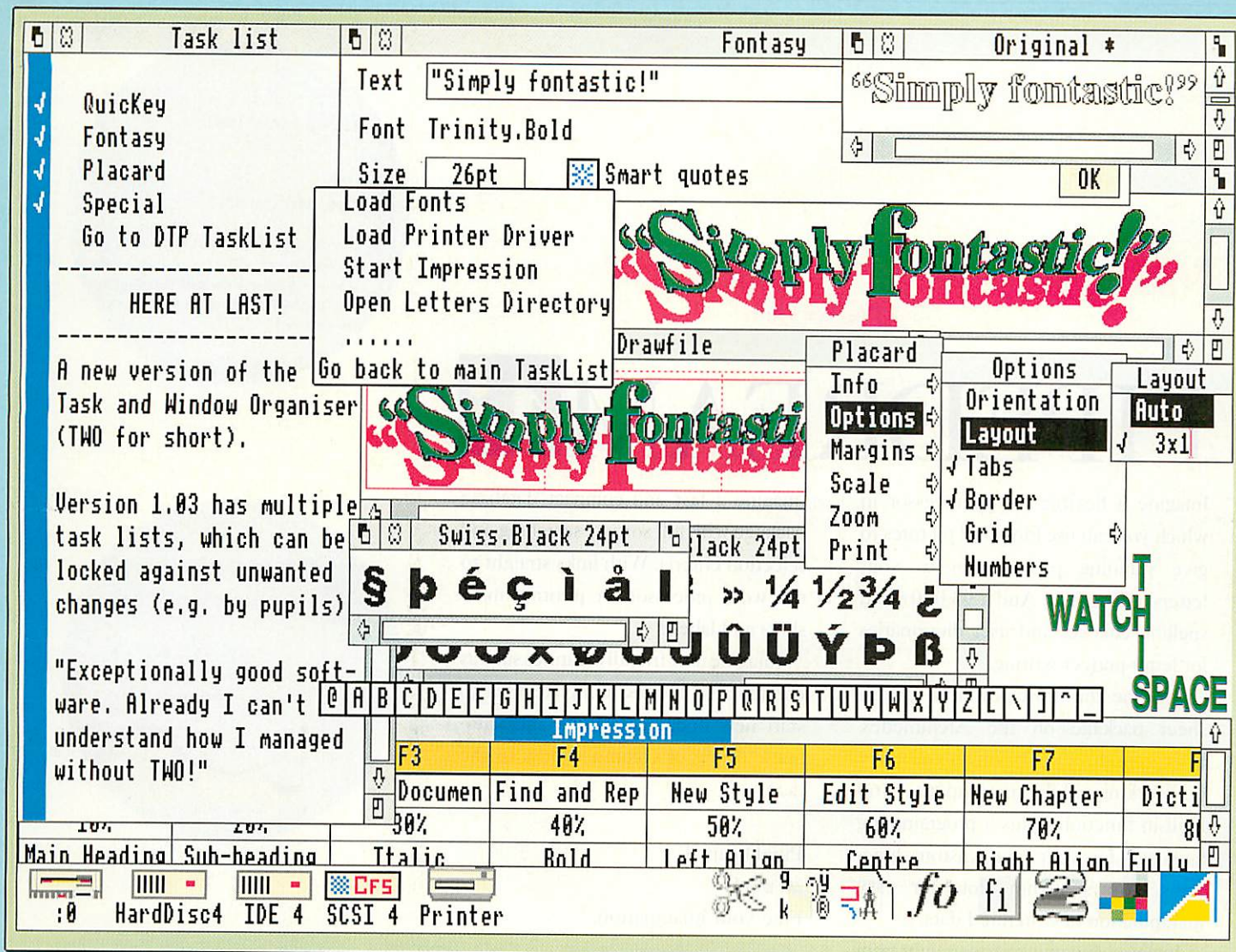
Please Send me further details on the following products.

Arm 3's ☐ Memory Upgrades ☐ General ☐

Name Tel

Address

Post Code Computer.....



Special

The simple answer when you need those funny characters. Also useful for viewing new fonts.

● **Only £10 (Site Licence £30)**

Fontasy

"Brilliant" – Micro User

"Very impressed with the ease of use and the control available." – Archimedes World

"Good value for money" – BBC Acorn User

Placard

The intelligent way to print draw files and sprites across several sheets of paper.

DrawBender

The genuinely flexible draw file moulder.

● **Buy Fontasy, DrawBender and Placard for only £45 (Combined Site Licence £80)**

QuickKey

"Just what you've always wanted ... so simple ... an essential utility." – Micro User

TWO

"Worth the asking price for the window tidying options alone. Something to offer everyone." – Archimedes World

"Really neat. Fontasy, QuickKey and TWO are so useful you wonder how you ever managed without them." – Micro User

Existing users please send disc and 12 first class stamps for update plus new manual.

● **Buy QuickKey and TWO for only £30 (Combined Site Licence £80)**

Please turn to our double-page price list for more information and ordering details. Or call our telephone number for friendly advice.

ICS
051-625-1006

UK customers please add VAT to prices shown

PIPEDREAM4

Imagine a flexible word processor in which you can use fonts and pictures to give stunning presentation to your letters and reports. And a 93,000 word spelling checker and user dictionaries for letter-perfect writing.

Imagine the most powerful spreadsheet package on the Archimedes. Background recalculation so you carry on working while it computes. 160 built-in functions, plus a programming language for your own custom functions. Arrays within slots for easy manipulation of structured data.

Imagine dynamic charts straight from your data. Multiple scales to compare trends. Personalised Penguin Graphics with bars filled by your own draw files to dazzle your friends and colleagues.

Imagine a fast and compact database package with full sorting, searching and selection criteria. With links straight to the word processor for printing mail-shots and labels.

Imagine user-friendly features such as configurable menus, template files to start new documents from, and automatic fitting of column widths to the data.

PipeDream 4


the works

Free your imagination.

RRP £196+VAT. Call for education prices and site licences. PipeDream 4 is ideal for any Archimedes, A3000 or A5000 with 2MB RAM or more.

COLTON software

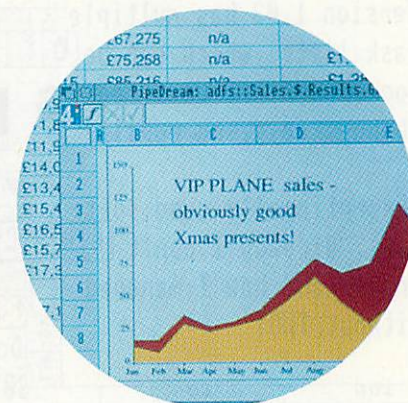
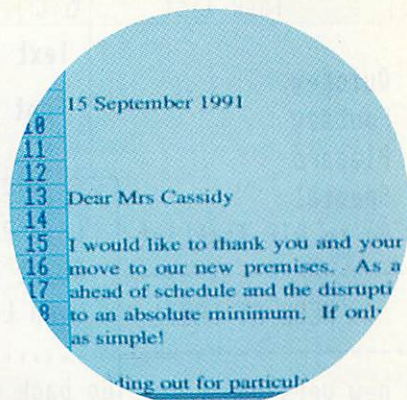
Coltonsoft Limited
2 Signet Court
Swanns Road
Cambridge
CB5 8LA
Tel: (0223) 311881
Fax: (0223) 312010

For a free  brochure, complete and return this coupon.

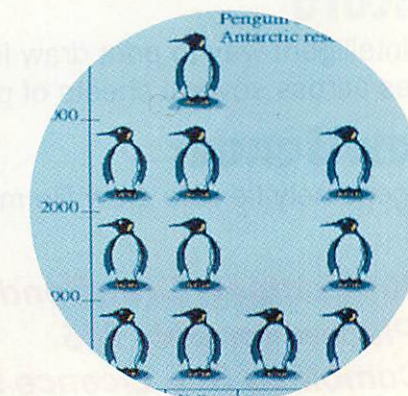
Name

Address

Postcode



	C	D	E	F	G
Grid x	2265	7264	48	SH	13
Grid y	2134	8345	45	WH	11
Munro	2970	7732	46	CG	7
Area	2266	7263	44	SH	13
Chap	2418	7875	43	CH	14
Pa	2212	7663	47	CH	8
	2144	8263	42	WH	10
	2470	7746	41	CH	1



**JUNE 1992
ISSUE 119**



COVER PHOTOGRAPHY
Robert Clifford

Editor Barry Monk
Assistant Editor Karen Donaghay
Technical Assistant Paul James
Art Editor Tony Judge
News Editor Ian Burley
Editorial Assistant Sarah Burns
Advertisement Manager
Duncan Pringle
Deputy Advertisement Manager
Richard Power
Sales Executives Areef Vohra,
Jack Manzoor
Ad Production Fiona Andrews
Production Manager Jennifer Jeffrey
Publisher Seamus Geoghegan
Publishing Director Michael Potter
Editorial Director Christopher Ward

Published by Redwood Publishing,
a BBC Enterprises Company, 20-
26 Brunswick Place, London N1
6DJ. Tel: 071-490 1444. Telecom
Gold 10081:RED001, Micronet
919992492. Bureau setting and
ad typesetting by Bold Gray Design, 52
Rosebery Avenue, London, EC1R 4RP.
Colour by Trumps Studio, Ware, Herts.
Printed by Cradley Print Ltd, West
Midlands. Distributed by BBC Frontline,
Park House, 117 Park Road, Peter-
borough. © Redwood Publishing 1992.
All rights reserved. Acorn is a registered
trademark of Acorn
Computers Ltd. Redwood
Publishing is a registered
data user. ISSN 0263 7456.



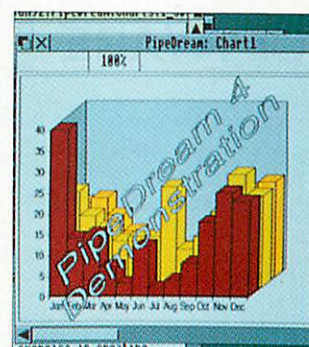
Member of the Audit
Bureau of Circulation

PRODUCED ON THE ARCHIMEDES

All the editorial pages in
BBC Acorn User are
produced on a DTP
system using Acorn
Archimedes 440/1 and
A540 computers, Com-
puter Concepts' *Impres-
sion 2* with Laser Direct
printers and Taxan
monitors

NEWS	7
GRAPHICS	15
COMMS	16
QUESTIONS AND ANSWERS	18
Problems solved and questions answered	
COVER DISC	22
Load up our free demo disc and find out what Pipedream 4 has to offer	
ARC vs MAC and PC	27
We pit the Archimedes against some stiff opposition	
STEPPING UP	47
How to get the best out of Impression – a step by step guide	
ARC ASSEMBLY	54
The next instalment of our series on assembly language	
*INFO	61
Tips, programs and programmer's advice	
C FOR YOURSELF	65
The first of a new series on the high-flier of programming languages	
WIRED UP FOR SOUND	70
Are you making the most of sound on the Archimedes?	
FREE ADS	74
Hardware, software: get your bargains here!	
YELLOW PAGES	77
Type 'em in and load 'em up, courtesy of yellow pages	
PUZZLE PAGE	87
SUBSCRIPTIONS	89
DIGITISERS	91
We look at two digitisers to use with your Archimedes	
MICRO TRADER	95
A new integrated business solution is put to the test	
TITLER	99
Find out all about the new video titling system from Clares	
JUNIOR PINPOINT	101
A junior version of Pinpoint put through its educational paces	
HOMeward BOUND	103
The three Rs of education covered in a suite of home-based programs	
ARCOL DESKTOP	107
Arcol is brought up to date with a new desktop version	
GAMES	112
Check out Aliped, Pesky Muskrats and Grievous Bodily 'Arm	
NEXT MONTH	114
LETTERS	120
More points of view from your fellow reader	

22 COVER DISC



65 LEARNING C



107 ARCOL DESKTOP



91 DIGITISERS



SOFTWARE

1st Word Plus	Acorn	£62
- extra copy of manual	Acorn	VO £10
3D Construction Kit	Domark	£38+
A3000 Technical Reference		
Manual	Acorn	VO £30
A5000 Technical Reference		
Manual	Acorn	VO £65
A540 Technical Guide	Acorn	VO £65
Adventure Playground, age 5+	Storm	£16
Aggressor	Atomic	£16+
Air Supremacy	Superior	£17+
Alerion	Dabs	£13
Alien Invasion	Dabs	£13
All-In Boxing	Dabs	£13
Alpha-Base	Clares	£34
ALPS Adventure Language		
Programming System	Alpine	£28
Amazing Ollie, age 4+	Storm	£14
Ancestry	Minerva	£59
ANSI C Release 3	Acorn	£124
- extra copy of manual	Acorn	VO £19
Arcade 3 Compilation	Clares	£12
ArcComm 2	Longman	£33+
ArcDFS	Dabs	£22
Arcendum	Dabs	£13
Archimedes Assembly Language	Dabs	VO £15
- with disc		£22
Archimedes First Steps	Dabs	VO £10
Archway 2	Simtron	£78
ArcLight	Ace	£40+
ArcMonitor	CIS	£24
Arcounts Manager	Visionscan	£295
ARC-PCB	Silicon	£138
- Professional	Silicon	£269
- Schematics	Silicon	£475
Arcterm 7	Serial Port	£54+
ARCTiculate	Fourth Dim	£21+
ARCTist	Fourth Dim	£21+
Arctivia	Moray	£21
Armadeus	Clares	£59
Artisan II	Clares	£43
ArtWorks	CC	£POA
Astro	Topologika	£29
Atelier	Minerva	£63
Autosketch CAD	Autodesk	£65
Avon	Topologika	£16
Ballarena	Elerna	£14
Bambuzle	Arxe	£16+
BASIC V Guide	Dabs	VO £10
BBC Basic Guide	Acorn	VO £19
Black Angel	Fourth Dim	£POA+
Blaston	Elerna	£14
Blitz	Arxe	£17

BlowPipe	Eclipse	£14
Bobby Blockhead vs The Dark Planet	Atomic	£16+
Bookstore, age 7-16	ESM	£39
Break 147 & Superpool	Fourth Dim	£28+
Broadcast Loader	Acorn	£63
Bubble Fair	Elerna	£14
Bug Hunter / MoonDash	Minerva	£13
Bug Hunter in Space	Minerva	£13
Business Accounts	Minerva	£298
CableNews	Lingenuity	£165
Cartoon Collection	Micro Studio	£16
Cartoon Line	Elerna	£17
Castle of Dreams	Storm	£17
Cataclysm	Fourth Dim	£21+
Caverns	Arcana	£13
C: A Dabhand Guide	Dabs	VO £14
- with disc		£22
C Development System	RISC	£77
Chameleon (new version)	4maton	£34+
Charts & Graphs	Computer Tutorial	£17
Chequered Flag	CIS	£17
- Extra Circuits	CIS	£16
Chess 3D	Micro Power	£14
Children's Graphics	Micro Studio	£16
Chocks Away	Fourth Dim	£21+
- Compendium	Fourth Dim	£32+
- Extra Missions	Fourth Dim	£15+
Chopper Force	Fourth Dim	£POA
Chuck Rock	Krisalis	£19
Clip Art	Graphics Factory	
- Vol 1 (General), sprites		£20+
- Vol 2 (General) / Vol 3 (Animals) / Vol 4 (Sport) / Vol 5 (Characters)	each	£25
Clip Art Set 1, drawfiles	Midnight	£29+
Clip Art Set 2, drawfiles	Midnight	£29
Coffee, age 9+	Storm	£28
Colour Screen»Mac	Human	£90
- Arc/Mac Cable	Human	£24
Compression	CC	£37+
Concept Designer	Longman	£22
Conqueror	Superior	£17
Control Logo	Longman	£22
Control Panel	Lingenuity	£14
Converta-Key	Triple R	£15+
Cops	Alpine	£15
Corruption	Magnetic	£21
Craftshop 1	4maton	£27
Craftshop 2	4maton	£27
Creator	Alpine	£31
Crisis	CIS	£12
Cross-32 Meta-Assembler	Baldon	£175
- manual for evaluation	Baldon	VO £15
Cyber Chess	Fourth Dim	£POA+
DataVision	Silicon	£110
DataWord	Triple R	£15+
Decorated Alphabet, sprites	Micro Studio	£17
Designer V.3	TechSoft	£193
Designer Intro	TechSoft	£75
Designer's Graphics, draw/sprites	Micro Studio	£16
Desktop Assembler Release 2	Acorn	£119
Desktop C Release 4	Acorn	£185
Desktop Folio, new 1992 edition	ESM	£87
Desktop Office	Minerva	£79+
Desktop Publisher	Acorn	£108
- extra copy of manual	Acorn	VO £10
Detect-a-Pet, age 5-11	ESM	£49
DFS Reader	RISC	£9
Disc Tree	Mitre	£38+
DrawBender	ICS	£15

- site licence		£50
Dread Dragon Droom	Resource	£21
Dreamwave	EMR	£34
Drop Ship	Fourth Dim	£16+
DTP Graphics 1 Mono, sprites	Micro Studio	£15
DTP Graphics 2 Colour	Micro Studio	£17
DTP Graphics combined	Micro Studio	£25
DTP Seeds	4maton	VO £8
DTP Theme Packs, age 5-16	ESM	
- Christmas		£35
- Editor's		£29
- Maths		£29
Easiword	Minerva	£16
EasiWriter	Icon	£115+
- Dictionaries: Danish / French / German / Italian / Norwegian / Spanish / Swedish / Welsh	each	£30
Einstein	Ace	£106
Elite	Hybrid	£33
Elucidata (OCR)	Iram	£155
- bought with Iram Scanner		£79
Enter the Realm	Fourth Dim	£21+

Fourth Dimension games are individually tested before we send them to you

Equasor	CC	£38+
Ethnic Borders	4maton	£10
E-Type Compendium	Fourth Dim	£21+
Euclid	Ace	£50+
Eureka	Longman	£109+
Express	Midnight	£49
Face Off Ice Hockey	Krisalis	£22
Family Favourites	Minerva	£14
Farmer Giles	Computer Tutorial	£16
Farmer Giles II	Computer Tutorial	£16
Film-Maker	Silicon	£70
Financial Accountant	Silicon	£199+
Finding the Way, age -5	Rainbow	£7
Fine Racer	Elerna	£14
Fireball II Xtra	CIS	£12
First Impression	Word Processing	VO £28
First Words and Pictures	Chalksoft	£19
Flexifile	Minerva	£79+
Flight Path, age 9+	Storm	£28
Flight Sim Toolkit	Simis	£34+
Flying Start II	Mitre	£86
Fantasy	ICS	£25
Fantasy / DrawBender / Placard		
- site licence		£80
FontFX	Data Store	£9
- site licence		£70
Font Pack - Newhall, Starter, Symbol		
- each pack	Acorn	£35
Font Pack 1 - Paladin, Swiss B, Symbol B, Vogue	RISC	£47
Font Pack - Avant Garde, Bookman		
- Pembroke - each pack	CC	£26+
Fortran 77 Release 2	Acorn	£75
Fortran Analysis	Armadillo	£60
Freddy's Folly	Minerva	£13
Freddy Teddy	Topologika	£18
- Balloons / The Zoo	Topologika	£27
- The Playground	Topologika	£27
- The Puddle / The Wardrobe		
Freddy Teddy's Adventure	Topologika	£27
Fun School 2	Topologika	£17+
- age -6, age 6-8, age 8+	each	£15
Fun School 3	Database	
- age -5, age 5-7, age 8+	each	£18
Fun School 4	Database	
- age -5, age 5-7, age 8+	each	£20+

Gammaplot	Minerva	£36+
Gate Array Design / Teaching	Silicon	£114
Genesis I	Oak	£40
Genesis II	Oak	£99
Genesis Plus	Oak	£69
GerberPlot	Silicon	£89
Giant Killer, age 10+	Topologika	£16
Giant Killer Support Disc	Topologika	£14
Good Impression	Word Processing	VO £27
GraphBox	Minerva	£55
GraphBox Professional	Minerva	£105
Graphic Writer	Clares	£24
Greetings Graphics, draw/sprites		
	Micro Studio	£16
GridIT	Widgit	£30
Grievous Bodily 'ARM	Fourth Dim	£21+
Gumshoes	Fourth Dim	£21+
Hard Disc Companion release 2	RISC	£45+
Hearsay II	RISC	£70
History Costume, sprites	Micro Studio	£16
Holed Out	Fourth Dim	£16+
- Compendium	Fourth Dim	£21+
Home Accounts	Minerva	£34
Hostages	Superior	£14
HotLink Presenter	Lingenuity	£29
House of Numbers	Chalksoft	£20
Hoverbod	Minerva	£13
Hyperbook Electronic Library (including Reader)	Longman	£109

Hyperbook Reader	Longman	£47
Ibix the Viking	Minerva	£13+
IC SWI	Baldon	£15
- bought with Oddule		£5
Illusionist	Clares	£76
Illustrators' Graphics, draw/sprites		
	Micro Studio	£16
Image Animator	Iota	£68
Image OCR	Iota	£POA
Image Outliner	Iota	£72
Imagine	Topologika	£33
Impression 2.16 or latest	CC	£125
- network version		£650
- site licence		£545
- extra hardware key for sites only		£15
- extra manual for sites only		VO £8
Impression Borders	CC	£19+
Impression Business Supplement	CC	£39
Impression Junior	CC	£69
- site licence		£435
- extra manual for sites only		VO £7
Insight	Longman	£68
Instigator	Dabs	£39
Interdictor 2	Clares	£25
Investigator 2	Vertical Twist	£22
IronLord	UBI Soft	£14
ISO Pascal Release 2	Acorn	£75

Jahangir Khan World Championship Squash	Krisalis	£10+
James Pond	Krisalis	£20
Jet Fighter	Minerva	£10
Jiglet	4maton	£25
Jigsaw	4maton	£27
Junior Database	Iota	£45+
Junior PinPoint	Longman	£23+
Karma	Periscope	£22
Kerbang	Elerna	£12
Keyboard Player	Chalksoft	£17
Knowledge Organiser	Clares	£42

Landmarks - Egypt / Rain Forest / Second World War / Victorians		
- each	Longman	£19+
Last Days of Doom	Topologika	£17+
Legend of the Lost Temple	Elerna	£19+
Lemmings	Krisalis	£17
Letters and Pictures	Chalksoft	£17
Level 4 Fileserver	Acorn	£185+
LISP	Acorn	£145
Little Red Riding Hood, age 5-8	Selective	£15+
Logistix	Acorn	£77
Logo	Longman	£49+
LogoPlotter	Longman	£19
Maddingly Hall	Minerva	£13+
Mad Professor Mariarti	Krisalis	£15
Maggie	Longman	£45
Mah-Jong European - The Game	CIS	£19
Mah-Jong Patience	CIS	£15
Mailshot	Minerva	£27
Manchester United Europe	Krisalis	£19
Manchester United Football Club	Krisalis	£19
Maps and Landscapes 1	Chalksoft	£19
Maps and Landscapes 2	Chalksoft	£19
Mark Master	Chalksoft	£67
Master Break	Superior	£14
Masterfile II	RISC	£19
Mazes, drawfiles	Micro Studio	£16
Memory Magic	CIS	£12
Mental Maths	CIS	£15
MicroDrive Golf	CIS	£14
- Extra Courses	CIS	£11
- World Edition	CIS	£23+
Micro Trader Accounts	PRES	£199
MiG-29 Fulcrum	Domark	£24+
MiG-29 Superfulcrum	Domark	£30
Military History, sprites	Micro Studio	£16
Minotaur	Minerva	£13
Missile Control	Minerva	£13
Mogul	Ace	£20+
Money Matters	Triple R	£15
Movaword	Chalksoft	£17
Mr Do	CIS	£16
MultiFS	Arxe	£27
Multistore version II	Minerva	£179+

Nature Graphics, draw/sprites		
	Micro Studio	£16
Nevryon	Fourth Dim	£16+
Nevryon 2 - Technodream	Fourth Dim	£POA+
Newton	Longman	£18+
No Excuses	Arcana	£21+
Nominal Ledger	Minerva	£78
Notate	Longman	£52+
Note Invaders	Chalksoft	£20+
Numbers and Pictures	Chalksoft	£20+
Numerator	Longman	£60+
Numerator Chaos	Longman	£19
Office Tools	Silicon	£276
Ollie Octopus' Sketchpad	Storm	£14
Order Processing/Invoicing	Minerva	£78
Orion	Minerva	£13
Ortery	Spacelech	£93
Ovation	RISC	£85
Overload	Clares	£13

HOW TO ORDER

VAT: UK customers please add 17.5% to the total price, except for the zero-rated items marked VO. Our VAT number is 595 7258 84.

CARRIAGE IS FREE WITHIN MAINLAND UK IF YOU PAY ON ORDERING. Remember this when you compare prices!

Overseas carriage: If you are paying by credit card we will add airmail and insurance at cost. Otherwise please add £6 (Europe) or at least £12 (elsewhere) for each software item and send a pounds sterling bank draft payable in England, or Eurocheques for not more than £100 each.

Credit cards are welcome. We do not charge your account until your order has been fulfilled. The name and address for delivery of goods should be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due.

Official orders are welcome. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

Site licences are available for most products. Please check our prices.

All products, prices and specifications are offered in good faith and are subject to change without notice. Your order will receive our attention immediately, but suppliers sometimes keep us waiting. Goods are guaranteed but we do not supply them on approval.

P acmania	Domark	£16+
Padlock	ICS	£10
- site licence		£30
Pandora's Box	Fourth Dim	£21+
PC Access	Minerva	£19
PC Emulator	Acorn	£85
Pendown	Longman	£47
Pendown Etoile	Longman	£POA
Pendown Outline Fonts	Longman	£19
Pendown Plus	Longman	£78
Personal Accounts	Apricote	£29
Pesky Musktrats		£21+
Phases#2	Northwest SEMERC	£15
Picture Book	Triple R	£15+
PinPoint	Longman	£69
PipeDream 3	Colton	£105
PipeDream 4	Colton	£179
PipeDriver Dot 1	ICS	£10
Pipe Mania	Empire	£18
PIPP1 Primary Integrated Project Planner	CIS	£36
PIPP2 Professional Integrated Project Planner		
- 5-14 Programme	CIS	£85
- Middle	CIS	£52
- Primary	CIS	£44
- Primary: Homes	CIS	£12
- Resource Centre	CIS	£129
- Secondary	CIS	£69
Pirate, age 8-14	Chalksoft	£19
Placard	ICS	£10
- site licence		£30

Placard now works with sprites too!

(Old disc plus 4 first class stamps to update)

Plague Planet	Alpine	£13
Poizone	Eterna	£14
Poster	Amation	£75
Powerband	Fourth Dim	£21+
Prehistoric Animals, sprites	Micro Studio	£16
Premier	Circle	£71
- DataBase	Circle	£25
- WordProc	Circle	£25
Presentation System	Silicon	£61
Presenter GTI	Lingenuity	£65+
Prime Art	Minerva	£69
Printer Driver, RISC OS		
- BJ10ex TurboDriver + Cable	CC	£48+
- BJC800 TurboDriver + Cable	CC	£98+
- CA (Canon PJ1080A)	Ace	£15
- CC (ColourCel)	Ace	£15
- DJ (Deskjet 500C)	Ace	£15
- Deskjet 500C	RISC	£15
- Epson, Star colour	RISC	£15
- JX (Epson, Star and Citizen colour)	Ace	£15
- PJ (HP Paintjet Colour)	Ace	£15
Pro Artisan	Clares	£70

Prophet (requires 2 Mb) Apricote £165.

Prophet Demo	Apricote	£10+
Protext	Amor	£114
Provocator	Computer Tutorial	£15
Puncman 1 and 2	Chalksoft	£16
Puncman 3 and 4	Chalksoft	£16
Puncman 5 to 7	Chalksoft	£17
Purchase Ledger	Minerva	£78
QuickKey	ICS	£15
- site licence		£45

R ealtime Solids Modeller	Silicon	£136+
Real McCoy	Fourth Dim	£24+
Real McCoy 2	Fourth Dim	£24+
Real McCoy 3	Fourth Dim	£29+
Redshift	Minerva	£14
Render Bender I	Clares	£55
Render Bender II	Clares	£95
Reporter	Minerva	£29
Repton 3	Superior	£14
Revelation 1	Longman	£54
Revelation 2	Longman	£95+
- CD Rom	Longman	£123
Reversals	Chalksoft	£17
Rhapsody 2	Clares	£45
RiscBASIC	Silicon	£112
RiscForth Compiler	Silicon	£110
Risc OS Companion Vol 1	Oak	vo £49
Risc OS Extras 1992	Acorn	£9
Risc OS Programmer's		

Reference Manual	Acorn	vo £79
Risc OS Style Guide	Acorn	vo £11
RoboLogo	Silicon	£69
Rockfall	Eterna	£16+
Rotor	Arcana	£19
S ales Ledger	Minerva	£78
Saloon Cars	Fourth Dim	£21+
Saloon Cars Deluxe	Fourth Dim	£POA+
Schema	Clares	£89
School Administrator	Minerva	£65
Science, drawfiles	Micro Studio	£25
Score Draw	Clares	£50
Scorewriter	EMR	
- PMS Dot matrix, Version 1		£127
- PMS Dot matrix, Version 2		£147
- PMS PostScript		£422
ScreenPlay	Widgit	£35
Screen Turtle	Topologika	£36
Search and Rescue, age 9+	Storm	£28
Seashore Guide, drawfiles	Micro Studio	£16
Sesame Street	Electric Crayon	
- Letters for You		£16
- Numbers Count		£16
SFXM	CIS	£34
ShapeFX	Data Store	£10
ShareHolder	Silicon	£135+
ShowPage	CC	£127
Shylock Gnomes, age 10-15	Selective	£19+
Sigma Sheet	Minerva	£38
SkyHunter	Longman	£23
smArt	Amation	£50
smArt Dinosaurs / Faces / Faces (French) /		
Faces (German) / Fashion / Heraldry /		
Homes / Homes (French) / Homes		
(German) / Leisure / Leisure (French) /		
Leisure (German) / Look Smart / Modern		
Languages / Smartoons / Trees and		
Gardens	- each	£15
smArtFilter	Amation	£32
Snippet	Amation	£26
SolidCAD	Silicon	£115
SolidsRender	Silicon	£115
SolidTools	Silicon	£269
Spark	David Pilling	£5
Sparkle	Morley	£59
Special	ICS	£30
- site licence		£30
Speech!	Superior	£14
Spelling week-by-week	Chalksoft	£22+
Splice	Ace	£29+
Sporting Triangles	CDS	£20
Sports Day	Selective	£22
Square Route	Computer Eyes	£16
Stock Management	Minerva	£78
Studio24Plus Version 2, age 11+ EMR		£149+
Studio24Plus Version 3, age 12+ EMR		£210
Super-Dump	Silicon	£20
Superior Golf	Superior	£14
Super-Plot	Silicon	£28
Supersounds	CIS	£15
Supersounds 2	CIS	£12
Swiv	Krisalis	£19+
System Delta Plus II	Minerva	£50
- Reference Guide	Minerva	vo £25

T ABS	ExplAN	£95+
Tactic	Eterna	£15
Talisman	Minerva	£12
Target Maths	Triple R	£15+
TechWriter	Icon	£245
Telling the Time, age 3-12	Rainbow	£7
Thundermonk	Minerva	£12
Timetabler	Minerva	£549
TimeWatch	Mitre	£24
Tiny Logo + Tiny Draw	Topologika	£27
Titler	Clares	£120
Toolkit Plus	Clares	£35
Tools Graphics, drawfiles	Micro Studio	£23
Top Banana	Hex	£19+
Touch Type	Iota	£39
Tower of Babel	Cygnus	£17
Trace	David Pilling	£5
Tracer	Midnight	£46
Tracker	Vertical Twist	£37
Transport, drawfiles	Micro Studio	£25
Trivial Pursuit	Domark	£22
Turbo Type	CIS	£20
Tween	Ace	£29
Twin	Acorn	£24
Twin World	UBI Soft	£14
TWO (Task and Window Organiser)	ICS	£19
- site licence		£60
TypeStudio	RISC	£43+

Utility Disc 1

Utility Disc 2	
Utility Disc 3	
Utility Collection	

V ector	
View»Mac 3	
- Arc/Mac Cable	
Vox Box	

W aterloo	
Wimp Game	
Wonderland	
Words and Pictures	
World Championship Boxing Manager	

World Geography Maps, draw	Micro Studio	£23
World Map Study, age 7-16	ESM	£42
World Wildlife, sprites	Micro Studio	£16
Worra Battle	Oak	£14+
WorraCAD	Oak	£83+
Worra Plot	Oak	£24

X-Fire

Z88: A Dabhand Guide	Dabs	vo £15
Z88 PipeDream Guide	Dabs	vo £15
Zarch	Superior	£14
Zelanites	Micro Power	£14

HARDWARE

A5000 COMPUTERS

2Mb Hard Disc Colour System	Acorn	£1499
- as above + Learning Curve		£1530
(Finance & special purchase schemes available)		

MEMORY

Fitting extra unless otherwise stated
† Fitting easy ‡ Fitting needs expertise

A3000 2 Mb Non-upgradable †	IFEL	£55
A3000 2 Mb Upgradable †	IFEL	£63
A3000 4 Mb †	Atomwide/IFEL	£140+
A310 2 Mb Upgradable soldered ‡	IFEL	£99
- as above + MEMC1a		£149
- as above + MEMC1a + fitting		£200
A310 4 Mb soldered + MEMC1a ‡	IFEL	£225
- as above + fitting		£277
- as above + fitting + OS3 carriers		£298
A5000 2-4 Mb Upgradable †	Atomwide	£109
A5000 2-8 Mb including fitting	Atomwide	£500
A5000 4-8 Mb including fitting	Atomwide	£391
A540 4 Mb †	Atomwide	£268

MISCELLANEOUS

386C PC Expansion Card	Aleph One	
- 1 Mb		£463
- 4 Mb		£579
4-slot 4-layer Backplane	IFEL	£59

Apologies to those who have waited longer than usual for recent orders. Our move to new premises caused a backlog which was very hard to clear, and we are grateful to all our old and new customers who were patient. To those who couldn't wait - please allow us another opportunity to show you how good our service normally is.

9060S Monitor	Elzo	£450
9070S Monitor	Elzo	£640
A300/400 Fan kit	ICS	£15
A310 RISC OS Carrier Board ‡	IFEL	£25
A5000 Fitting Kit for second hard disc		
	ICS	£15
ARM3 ‡	Aleph One	£199+
Clares Micro Mouse	Clares	£26
Dongle Dongle with screw fittings	ICS	£6
Fan filters (pack of 10)	ICS	£4
FaxPack	CC	£289
Monitor Stand for A3000	ICS	£18
Podule Case for A3000		£16+
TouchWindow	Lindis	£234
Whisper Fan Quietener		
(for A300/A400 series only)	ICS	£15

HIGH DENSITY 3 1/2" FLOPPY DISCS

Pack of 10		£13+
------------	--	------

Data Store £8.

Data Store		£13
Data Store		£7
Data Store		£21

4matlon	EPOA	
Human		£65
Human		£24
Clares		£47

Fourth Dim		£23+
Fourth Dim		£16+
Virgin		£24
Chalksoft		£17

Krisalis		£20
Micro Studio		£23
ESM		£42
Micro Studio		£16
Oak		£14+
Oak		£83+
Oak		£24
Fourth Dim		£21+

Dabs	vo	£15
Dabs	vo	£15
Superior		£14
Micro Power		£14



PRINTERS

ArcLaser 300-6	Calligraph	£895
ArcServer 300-8	Calligraph	£985
Bubble Jet BJ-10e	Canon	£205
Bubble Jet BJ10ex + TurboDriver	Canon/CC	£248+
Bubble Jet BJ-300	Canon	£360
Bubble Jet BJ-330	Canon	£405
Bubble Jet BJC800 + TurboDriver	Canon/CC	£1889+
Laser Direct HiRes4 with 50-sheet tray	CC	£885+
- 250-sheet Paper Cassette		£99
Laser Direct HiRes8	CC	£1280
Laser Direct LBP-4 Card	CC	£325+
Laser Direct Qume	CC	£699+
LBP-4	Canon	£659
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

SCANNERS, DIGITISERS

ArcScanner including Epson GT-4000	Clares	£1660
FaxScan	SpaceTech	£94
FX9600AT + Maintenance	Amstrad	£376
Hawk V9	Wild Vision	£199
- A3000 version	Wild Vision	£278
Image (colour)	Iriam	£589
Image Scanner	Iota	£389
- Colour upgrade	Iota	£98
i-Scan 200	Iriam	£539
i-Scan 400	Iriam	£589
Pineapple Colour Video Digitiser		
- A3000 boxed	Pineapple	£195
Scan-Light A4	CC	£230
- with Sheet Feeder	CC	£277
Scan-Light Junior	CC	£370
- A3000 internal	CC	£128
Scan-Light Junior 256	CC	£128
- A3000 internal	CC	£199
Scan-Light Professional	CC	£199
- as above + SCSI interface	CC	£825
SnapShot Colour Video Digitiser		£910
- A3000 version	Lingenuity	£195
Spectra	Lingenuity	£275
- A3000 Internal	RISC	£545
- A3000 External	RISC	£545
Video Digitiser	HCCS	£565
		£49

I2C PRODUCTS

AnDi Oddule	Baldon	£49
I2C Adaptor (needed unless you already have an I2C socket)	Baldon	£10
I2C SWI (enhanced I2C_Control)	Baldon	£15
- bought with Oddule		£5

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
- Archimedes / A5000	Kador	£14
- A3000	Kador	£14

FUNCTION KEY STRIP ORGANISER

Arckey	ICS	vo £3
- pack of 4		vo £10



AUTHORISED ACORN DEALER

ICS (Ian Copestake Software)
Dept B31, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET
Tel: 051-625 1006 Fax: 051-625 1007



Only ICS manufactures genuine *ideA* hard disc upgrades for Acorn computers.

A3000 Internal or
Archimedes 'Hard Card'

20 Mb	£189
40 Mb	£375
80 Mb	£649

Archimedes Internal

40 Mb	£249
80 Mb	£359
105 Mb	£379
200 Mb	£499
340 Mb	£875

Prices exclude VAT. Carriage free on UK prepaid orders.

Will you settle for anything less?

ICS (Ian Copestake Software)

Dept B31, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET

Tel: 051-625 1006 Fax: 051-625 1007





COMPUTERS BY THE TROLLEY LOAD

CAN THE trolley-filling philosophy of megastore shopping translate to computer buying? Well, if the Croydon-based PC World store is anything to go by, it can.

PC World, part of the Vision Technology Group, claims to be the largest PC store in the UK, with over 30,000 sq feet of floor space and over £1.5 million-worth of stock. Selling most brands of personal computer, including Acorn A5000 and BBC A3000 machines, there are special demonstration areas for both hardware and software. There is also a special area where software can be loaded and the machine of your choice fully checked before you leave the store.

PC World's managing director Jan Murray agrees that computers have become commodities, and that the demand is there for more out-of-town megastores like PC World. Indeed, the company is planning to open at least one new store in the near future, in north London.

Since taking over Simnett Computers in 1990, the company has become one of Acorn's largest dealers, selling several thousand units per year. 'We have a wide variety



Managing Director Jan Murray with an A5000

of customers who are looking for Acorn products, ranging from educationalists to concerned parents who want to buy the same computers as their children use in school.

'Although Acorn is still regarded as an expensive

option, we believe there is plenty of potential for the brand.' PC World is on the A23 Purley Way, Croydon, Surrey. It opens seven days a week (9am to 7pm Mon-Fri, 9am to 6pm at weekends). Tel: 081-649 9000.

NEWS IN BRIEF

● **DURING** the nine months from April to December 1991, the BBC A3000 computer gained a 37 percent share of the UK schools' computer market, according to a report from the Research Support and Marketing Organisation. This is 6 percent up on last year and more than five times the share of any other computer.

Computer models from Research Machines, Apple, and IBM all failed to break the 10 percent market share barrier. It is now estimated the A3000 represents 15 percent of all the half-a-million-plus computers installed in schools. Acorn's new general manager of education, Peter Talbot, said he was delighted but not surprised by the figures. His former employers, Commodore, failed to show significant success in gaining a foothold with its computers in the education market, despite determined efforts.

● **A MAJORITY** stake in Newcastle-based Wild Vision has been acquired by Computer Concepts. Wild Vision is best known for its Hawk V9 digitiser and Chroma Series for the Archimedes.

Computer Concepts' Charles Moir told *BAU* that his company's relationship with Wild Vision means that the software team at CC's Hemel Hempstead HQ could continue with its software projects, like *Impression* and *Art-Works*, while Wild Vision's hardware expertise would benefit from CC's software know-how. 'It has become clear that the two companies complement each other very well,' commented Moir. Both companies are preparing for an expected boom in multimedia products later this year. Wild Vision's Peter Wild added: 'Not only will our relationship with Computer Concepts provide excellent software opportunities and financial advantages, but I believe that this turn of events will prove catalytic in giving Wild Vision's desktop video products a considerable step-up in the multimedia arena.' Both companies will continue to operate with their own corporate identities, but we can expect several joint ventures in the future.

ACORN WEATHERS THE RECESSION

THERE has been a welcome return to profitability by Acorn according to results published for the second half of 1991.

A net profit of £694,000 for the second half of the year to December 1991, more than compensated for a £420,000 loss during the first half of that year.

Operating profit was more than halved from £2.6 million to £1.1 million. After interest payments and £102,000 attributed to a loss in a 'related' company, the final net profit was £274,000 compared with £1.58 million in the previous year.

Improved margins and tight cost control countered a recession-lead erosion of overall sales volume from £45.1

million to £40.9 million. During the year Acorn managed to move from an overdraft of £6.5 million to £1.4 million in the black. The previous year's losses were brought forward so that no tax was chargeable in the year 1991.

Acorn's recovery was not helped along, as has been the case in the past, by any extraordinary items outside the company's main business of selling computers, so the results can be regarded as reasonably impressive.

Advanced Risc Machines Ltd, the spin-off company co-founded by Acorn, Apple and VLSI Technology, has exceeded all of its targets and is performing well according to Acorn (see page 9).

Acorn subsidiaries in New Zealand and Australia both increased their market shares.

Acorn's chairman and director of corporate developments, Ernesto Musumeci, congratulated Acorn's employees around the world: 'They have been the key in achieving the company's successes in a period of economic recession. It is because of their quality and hard work that Acorn's principal shareholder, the Olivetti Group, continues to hold such confidence in the company.'

No dividend was issued to shareholders. However, upon the release of the results, Acorn's shares rose by 40 percent within two days. For further information, contact Acorn on (0223) 245200.

Desktop Thesaurus

NEW

Desktop Thesaurus contains over 11,000 keywords and nearly 90,000 carefully chosen alternative words. It is ideal for developing language skills in the office, in school or at home.

The synonyms for the required keyword are listed in a scrolling window according to parts of speech, so nouns, verbs etc are grouped together. Clicking on any synonym itself then selects that word as a keyword and displays its synonyms, allowing you to browse through the data for the ideal alternative word. You can step back through earlier keywords, or step through the keywords in alphabetical order. When you have located an alternative word, it may be transferred instantly into almost any compatible application for you. Ideal for use with Ovation, Impression, Edit, Pipedream, 1st Word Plus, Pendown, Desktop Folio and other desktop publishers and word processors.

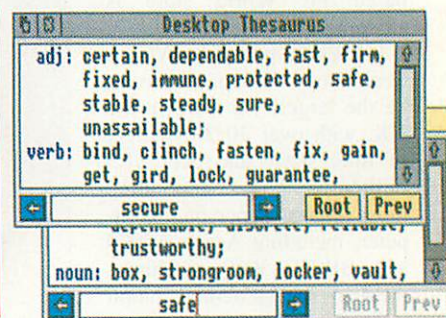
Desktop Thesaurus uses a compression system allowing the Thesaurus data to use disc space efficiently. Thesaurus data is accessed directly from disc saving valuable RAM, but is almost instantaneous from hard disc (a little slower from floppy disc).

Thesaurus data may be exported as plain text for editing, and the modified file re-imported into the Thesaurus. This powerful feature allows the Thesaurus to be easily modified or expanded. Due to the large size of the uncompressed data file, it is not possible to use this feature on a 1Mb RAM machine.

Price £19 + VAT

Site Licence Price £95 + VAT

DESK
TOP
Thesaurus



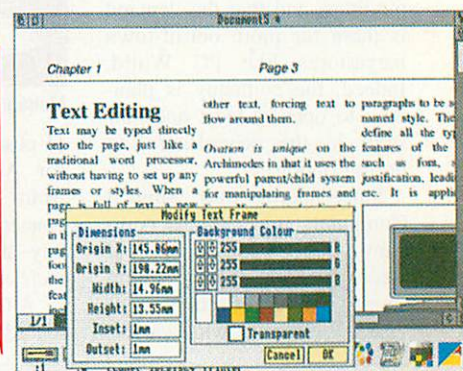
Ovation

Ovation sets new standards of quality and value by offering professional features in an easy-to-use package at a very competitive price. We guarantee that you will be able to produce high quality documents within hours of opening the package. Ovation provides a formidable array of desktop publishing features, yet can be used just like a traditional word processor to produce single page letters or entire books with complete ease. The package includes a 250 page user guide suitable for both novices and experienced users, a quick reference card, 7 outline fonts, and a range of clipart.

- multitasking/multi-documents • full WYSIWYG display
- fast spelling checker (needs 2Mb) • variable views • headers/footers
- font size 1-1000pt • master pages • import draw & sprite files
- full colour support • linked frames • multiple columns • stylesheets
- definable frame borders • auto hyphenation (needs 2Mb)
- find & replace • line drawing • cut, copy, paste via clipboard
- dot-matrix & laser printer drivers

Price £99 + VAT

Site Licence £475 + VAT



C Development System

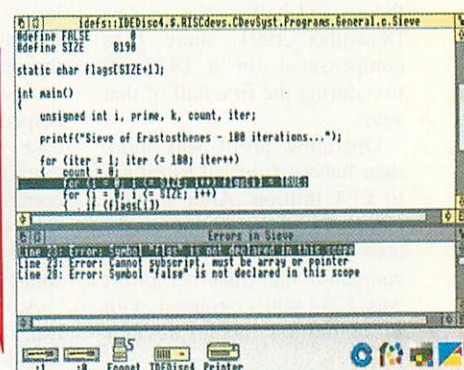
The C Development System is a complete C language conforming to almost all of the ANSI specification. The package contains a compiler which is quick, easy-to-use and generates ARM code which may be linked to other programs using the linker.

Also included is a multi-tasking editor from which programs may be written, compiled and executed without leaving the desktop. In fact you can compile, link and run C programs at the press of a key. The compiler errors are automatically highlighted in the editor for easy correction making it ideal for beginners learning C.

The package also includes a range of RISC OS functions, a library manager for creating new libraries, a Make utility, and a built-in ARM assembler for advanced users.

Price £77.39

Site Licence £385 + VAT





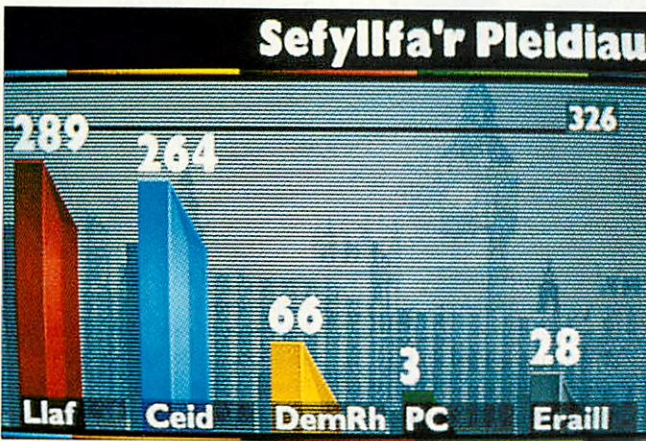
ARC CHARTS ELECTION FEVER

WELSH television viewers enjoyed Archimedes-generated graphics to show the results of the recent general election. BBC Wales decided to go for an unorthodox and more cost effective solution than the usual *Quantel Paintbox*-based system for generating animated on-screen graphics. The

Cardiff-based company, Now Motion, was chosen and it used six Arc machines. Three Arm3-fitted A440s were connected to a Millipede Prisma 3 high-resolution graphics board; one provided a headline flashed on a strip along the bottom of the screen, while the other two generated full-screen

graphics from over 50 different templates. A fourth A440 was hooked into a Dec mini-computer, based at BBC Wales, which provided results. The fifth Archimedes was an A310 providing staff with scrolling data on the 40 most recent declarations, which were also relayed to BBC Radio Wales and Radio Cymru. Another A310 was used as a slave and to show presenters which graphic was about to be shown.

The software, all running under Risc OS, was written by Now Motion's Carl Blundell. He explained why he chose a system based on the Arc: 'Conventional TV graphics tolls, such as Quantel, cannot produce animated bar charts without considerable manual effort. However, Acorn's multi-tasking desktop environment provides a powerful graphics environment'.



Election graphics created with the Archimedes-based system

WATFORD WINS BUSINESS AWARD

MAJOR Acorn dealer, Watford Electronics, recently won £500 and a cut glass trophy for finishing first in the Marketing Innovation section of the Hertfordshire Business Awards.

The competition was organised by Hertfordshire Training and Enterprise Council (TEC).

Watford Electronics was cited for stepping up its investment in research and development despite the onset of an economic recession.



Watford Electronics' MD, Nazir Jessa (centre) receives the award

QUEEN'S AWARD FOR ARM CHIP

ACORN has won its second Queen's Award for Technological Achievement. The award is for the development of the 32-bit Arm (Acorn Risc Machine) microprocessor now installed in over 180,000 Acorn Archimedes computers. Work on the Arm chip first started back in 1983.

Working samples were available by 1985, several years before the rest of the industry decided that similar

technology was the way forward. Risc (reduced instruction set computer) technology is now the leading growth area in computing. Arm chip development is now handled by the Acorn spin-off company Arm Ltd, jointly owned by Acorn, Apple Computers and VLSI Technology.

Unlike most of its more recent Risc competitors, the Arm chip remains very compact and requires relatively

little power, making it ideal for portable computing applications. The Arm is also easily customised.

Acorn first won the Queen's Award back in 1983 for the design of the original BBC micro. Acorn's managing director Sam Wauchope commented: 'The Arm processor represents a major step forward in computer technology and all of us are very proud of this achievement.'

NEWS IN BRIEF

● **A NEW** software package designed specifically for school physical education departments has been produced by Selective Software of Street, Somerset. The package, called *SportsDay*, helps in the planning and organisation of a sports event. Teams, competitors and results can all be managed by the computer and there are hard copy options for scores, and so on. It costs £22.50. Contact Selective Software on (0458) 43079.

● **AVATAR**, a new multi-user role-playing fantasy game running on a single Archimedes 440, has become available on the Silicon Village online viewdata service for computer enthusiasts. The game itself is a hybrid of Assembler and compiled Basic. Players assume the role of a 'godling' character which has to accumulate wisdom and other attributes and develop into a 'full god'. Eventually the system will be connected to Silicon Village via an Ethernet link.

To access the Silicon Village demonstration service, set your comms software to viewdata and dial 081-756 6996 using an ID of ten 4s and a password of four 4s.

● **SOFTWARE** developers and educational establishments are being offered a mastering service based around Acorn's recently launched Replay multimedia 'movie' software. Replay-compatible ARMovies can be produced by Cardiff-based Uniqueway Ltd from a variety of source-media including video tape or film.

A wide variety of video tape formats is supported. Completed ARMovies are supplied on magneto-optical disc or hard disc. Turnround can be as fast as 72 hours for short movies. The service costs a basic £100 per minute, with a minimum charge of £300 or £200, depending on the source media. Fast 25 frames per second movies are slightly more expensive.

Uniqueway points out that Acorn Replay movies are much higher quality than Apple's rival QuickTime technology for the Apple Macintosh.

Contact Uniqueway Ltd on (0222) 615782.



'ION' OUT IMAGING PROBLEMS

CAMBRIDGE Software House has gained exclusive initial supplies of Canon's latest still-video camera, the Ion RC560.

The first shipments of the new camera – which will lie at the heart of CSH's new ColourMaster Professional digitising system for the Archimedes – have just arrived in Cambridge.

The Ion RC560 features a number of improvements over the original RC260 model. An enhanced picture mode is now supported which effectively provides an interlaced picture, although this does halve the



The CSH digitising system is based around the new Canon Ion camera



A picture 'grabbed' using the new Canon Ion camera

camera's 2.5in magnetic disc storage capacity due to the larger amount of data. A 3x zoom lens with autofocus now replaces the fixed focus, fixed focal length lens. An infra-red remote control enables the user to arrange pictures so that several can be printed together.

ColourMaster Professional includes the Ion RC560 camera, infra-red remote, a high quality video digitiser, a 35mm transparency copy holder, cables plus software. The retail price is £2250 plus VAT or £1995 plus VAT for education. For more information contact Brian Richardson at CSH on (0480) 67945.

SEE CADET TRY BEFORE YOU BUY

MINERVA Software is to release *CADet*, a 2D computer aided design (CAD) package suitable for educational use, later this month. The package is fully multi-tasking and uses Risc OS printer drivers for output. It also includes HPGL plotter support for up to A3-size pages.

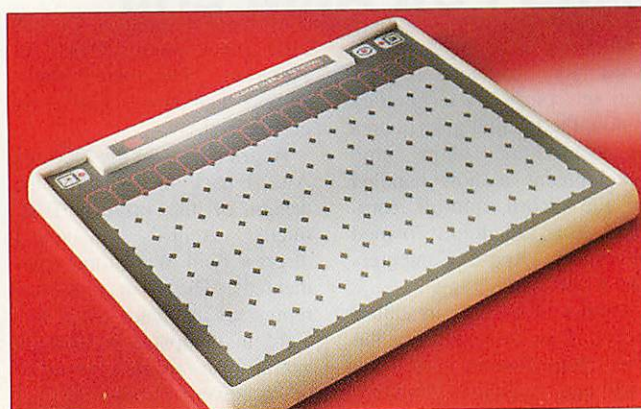
There is a user-definable symbol library for all those strange shapes, and fill types include several used in Ordnance Survey maps, such as trees, grass and swamps. Drawings can be imported and exported as *Draw* files and files such as those from *AutoCad* can be imported. *CADet* will cost £149 plus VAT. Contact Minerva Software on (0392) 437756.

POTENTIAL purchasers of the Oldham Overlay Keyboard for BBC micro or Archimedes computers can now try it out before they buy.

Simnett Computers is offering this year's British Edu-

cational Technology award winner on 30 days sale or return to schools.

The Oldham board costs £120 plus VAT. For further details of the offer contact Simnett on 081-680 3830.



NEWS IN BRIEF

● **SUNNYHURST** Software in Lancashire has produced a low cost disc containing *Draw* files designed for use by pupils at key stage 2. The idea is that these drawings can be used to gain experience and confidence with *Draw*. The *Draw_Ideas* disc is priced at £4.50. For further details contact Sunnyhurst Software at 3 Earnsdale Avenue, Darwen, Lancs BB3 1JW.

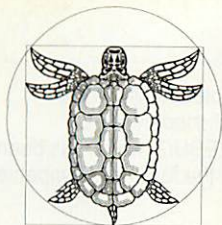
● **ARM LTD** has announced that the latest member of the new Arm6 Risc processor family, a development of the same processor technology used in Acorn Archimedes computers, has been completed in record time.

The new Arm610 was initiated in November last year and first supplies were delivered in February this year. The Arm610 is an optimised design, which leaves out the maths co-processor interface, delivering 15mips performance at a clock speed of 20MHz, which is faster than the Arm3 used in Acorn's A5000 and A540 computers (13.5 mips at 25MHz).

● **CALLING** all EMR software users. Club A3000, in association with Archimedes music specialists EMR, is to hold a masterclass/tutorial for users of EMR Studio 24+ software. EMR's Mike Beecher will be there to help users brush up their Studio 24+ skills. A limited number of seats are available for the event, which will take place at Mill Hill School in London on Sunday May 17. For further details contact Rene Barreto on 081-445 2126.

● **COLOUR** has been added to the capabilities of the nine- and 24-pin dot matrix Panasonic QuietPrinter range. A seven-colour palette – including magenta, blue, violet, yellow, red and green – is now optional for KX-P2123 (£340) and KX-P2180 (£270) printers. Contact Panasonic on (0344) 853915.

● In *BBC Acorn User* last month we stated that Teleview was distributed by SJ Research. In fact, it is being distributed by the Dudley Education Centre. Tel: (0384) 634155.

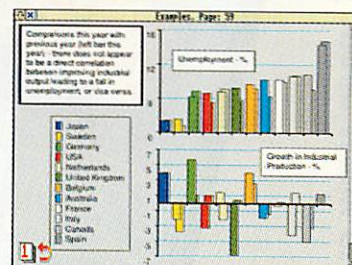
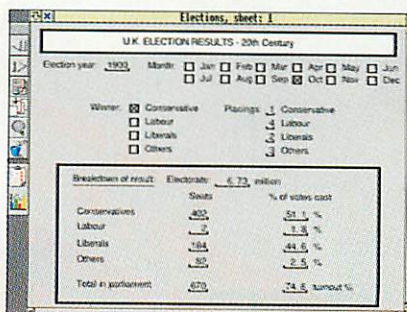
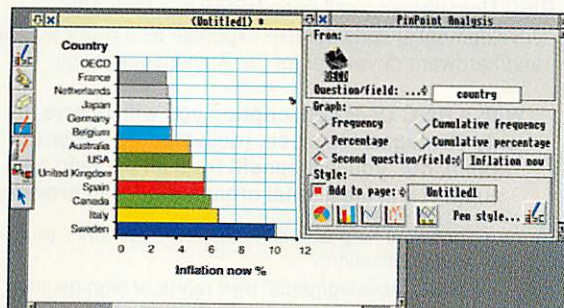


LONGMAN
LOGOTRON

PinPoint

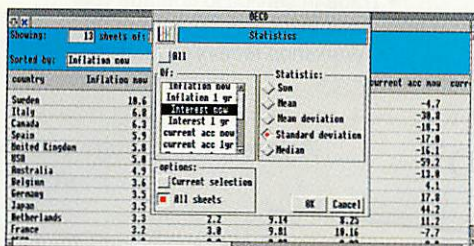
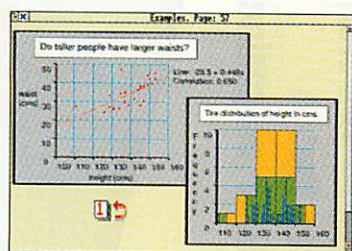
“The ease with which data collection may be organised and implemented is a joy.”

Frank Jukes,
Micro User, January 1992



“PinPoint is certainly a new generation database, making the handling of data as easy as it should be. Its concept and execution is brilliant — data handling is about collecting data efficiently, and that is what PinPoint does. PinPoint is powerful yet simple to use and will take educational data-handling into a new era.”

Dave Futcher, BBC Acorn User December 1991



BRITISH BUTTERFLIES

Name: Chequered Skipper

Family: ☒ Hesperiidae, ☐ Papilionidae, ☐ Pieridae, ☐ Lycaenidae, ☐ Nymphalidae, ☐ Nymphalidae, ☐ Satyridae.

The stage in which this butterfly spends the winter: ☐ Egg, ☐ Larva (caterpillar), ☐ Pupa (chrysalis), ☐ Adult (butterfly), ☐ None (migrates from Europe).

Method of pupation: ☐ Loose, ☒ Girdled, ☐ Suspended.

Months in which you can find the eggs of this butterfly: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.

Months in which you can find the caterpillars of this butterfly: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.

Months in which you can find the chrysalis of this butterfly: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.

Months in which you can find the adult form of this butterfly: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.

“Has Longman Logotron developed a new form of database altogether? In one word yes. To call PinPoint a mere database, or even mildly more boastful, a new generation database, is to diminish what in truth is a revelation.”

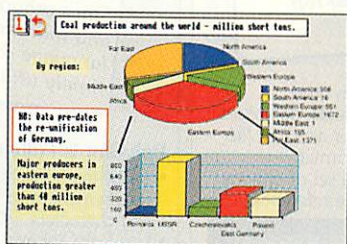
“The scope and variety of PinPoint is quite astonishing. The sheer variety, the power, the complexity of this program is astounding. The analysis and display aspects are both powerful and attractive enough to operate in both an educational and business environment. Databases will never be the same after this.”

Duncan Evans, Archimedes World
December 1991

“Pinpoint takes databases into a new dimension in several ways. First, form design. PinPoint is about as adaptable as the best desktop publishing package when it comes to creating the form upon which information will later be entered and stored.”

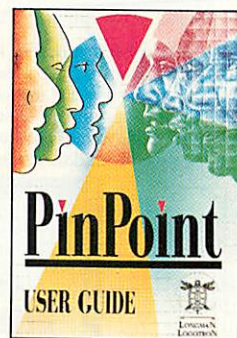
“When its abilities to produce statistics, charts and diagrams (with more ease and speed than I would have believed possible), and to print the results in attractively designed page format is considered too, then it becomes an essential purchase for anybody wishing to collect, analyse and present information.”

Chris Davies, Times Educational
Supplement, November 1991



Longman Logotron
124 Science Park
Milton Road
Cambridge CB4 4ZS.

Tel. (0223) 425558
Fax (0223) 425349



PinPoint for the
Acorn Archimedes is
priced at £99. A Site
Licence costs £400.



A special version for
primary schools is
priced at £24. A Site
Licence costs £72.

Everything you want to know about your Archimedes..
you can find in
RISC User magazine

RISC USER

The most popular
subscription
magazine for the
Archimedes,
A3000 and A5000

**Celebrates
the 10th anniversary of its
parent company
BEEBUG**

For subscription
(£19.90 a year for UK)
phone 0727 40303 fax 0727 860263
or write to the address below

RISC User is a high quality magazine devoted totally to the Archimedes range of computers. It is published by RISC Developments, formed last year from BEEBUG, which has been established for over ten years as one of the foremost companies in the Acorn market.

RISC User is produced by a dedicated and enthusiastic professional team which benefits from 10 years of experience gained in publishing the popular BEEBUG magazine for the BBC micro and the Master 128.

RISC User can also call upon BEEBUG's (now RISC Development's) considerable expertise as a major software and hardware developer for the Archimedes range.

With a RISC User subscription you will receive not only 10 magazines a year (delivered free to your home), but you will benefit from all the help and support a professional organisation can provide:

- Technical help with all RISC Developments' products and publications
- RISC Developments' own range of high quality hardware and software with special discounts for magazine subscribers
- Showroom with friendly professional staff, where you can try out the latest software and hardware
- Retail catalogue, mailed free to magazine subscribers, with regular updates on new products
- Tele-sales operation, where you can get technical guidance about your software or hardware requirements
- Speedy mail-order service
- Trade-in service to upgrade your equipment
- Workshop repairs by qualified staff

ChartWell

A sophisticated graph and chart package

ChartWell offers 24 different graph types: horizontal and vertical bar charts, line graphs, scatter charts, polar plots and pie charts.

Complete user control over: choice of colour, data point styles, bar widths and spacing, use of titles and labels, legends to provide a key, graduated/shaded backgrounds, scales and tick marks, etc.



Acorn User

...ChartWell: simple but effective.

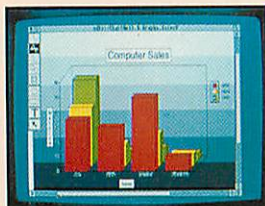
ChartWell scores on simpler controls over the basic graph types. It also has enough effects to present material prettily at a price that makes it attractive to the home or school user.

...All the options chosen can be saved in a 'Style Sheet' file which makes it remarkably easy to create the same type of graph again...

Archive

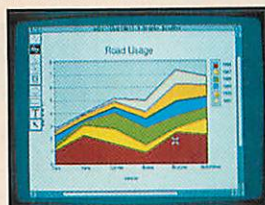
...This program from RISC Developments uses a really clever approach exploiting the desktop philosophy to the full.

Data can be imported from other applications, such as spreadsheets, databases, or created with a suitable editor as a text file. **Output** is in standard Draw format. Use of 'style sheets' allows a set of options to be saved with data for future reference.



A variety of display options:

flat or 3D bar and pie charts, user choice of angle for 3D display, clustered, stacked or layered bar charts, scatter graphs with choice of curve fitting techniques, regression lines and correlation coefficients, and use of error bars, line graphs with choice of normal, cumulative area or stacked area displays.



Chartwell and manual £29.95 inc +2.00 p&p Code PCHWa

POLYGLOT

A foreign language character generator

Archimedes World

...PolyGlOt is a helpmate for wordprocessor and DTP software...which lets you choose from a European language character set rather than plain old English ASCII.

Typing into a document is very simple and the character appears at the cursor position when you click on it...

...The documentation is pretty good and a full explanation is given for the more technical areas.

... a vital add-on for a text editor, wordprocessor or a DTP program. Since schools and businesses are more and more in need of a foreign language capability, than this is a timely utility for the Archimedes.

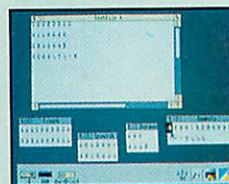
Open a window for any specified language, and this will display all characters which are impossible or difficult to obtain from the keyboard: for example, accented characters in French, or umlauted characters in German. Select any of these characters with the mouse and it will automatically be inserted into your document.

Why PolyGlOt is better than any other system

- Characters are displayed in both upper and lower case
- No need to set your keyboard to a foreign standard to obtain foreign characters.
- Use different languages or alternative character sets simultaneously.
- Use any character set, any alphabet and even scientific characters (provided your fonts support these).
- Comprehensive printing support.

PolyGlOt is Fully Customisable

- Tailor the application to your own specific requirements and include only the languages and characters, which you actually need.
- Use PolyGlOt as a simple way of selecting from any set of characters, i.e. currency signs or other symbols.
- Customise PolyGlOt to use any of the available alphabets within your Archimedes (for this you must have suitable outline fonts or printers which support alphabets other than the standard Latin1).
- Ideal for education where the package can be readily tailored to suit the needs of individuals and classes.



PolyGlOt and manual
Price £19.95 inc + £2.00p&p
Code PGLTb



PRIMEART GOES HI-RESOLUTION

MINERVA Software's art package for primary and special needs students, *PrimeArt*, has been modified for use with mode 21 on the Archimedes.

Minerva says that, as far as it is aware, *PrimeArt* is the only program of its type to work in this mode, making it ideal for users lucky enough to have a hi-res multi-scan monitor. Mode 21 has twice the vertical resolution of Mode 15, meaning that pictures will look more 'real'. *PrimeArt* costs £79.95 plus VAT.



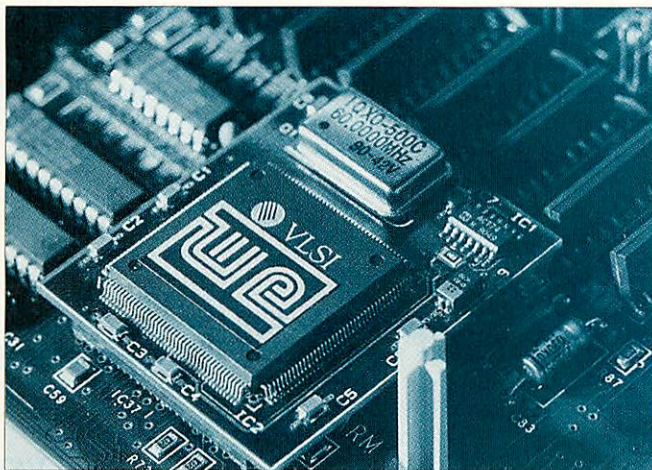
ARM 3 GOES FAST!

CONGRATULATIONS to Mr J F Lakin of Solihull, who has won a Watford Electronics Arm 3 upgrade board, offered in the exclusive competition we ran in our February issue.

His winning catchphrase was: 'I would like to have a

Watford Arm 3 in my machine because ...it's so fast, it's just a dream, please can I have it in my machine!'

The correct answers were: 1) B 2) The A540 3) Luton. Our thanks to all of you who entered.



REPLAY CD

ACORN'S new Replay system has been utilised for the first time in a commercial multimedia CD Rom publication, *The Dictionary of the Living World* from Media Design Interactive. The disc contains over 2,500 text entries, 1,000 illustrations, 100 animal sound sequences and 100 Replay video clips. *The Dictionary of the Living World* has been ported over from the Apple Macintosh where it has been a great success.

All data types can be exported to hard or floppy disc as stand-alone data for use in other applications. A full set of National Curriculum-based teacher notes is available, although MDI hopes to sell the disc to individuals for home use as well. It costs £175 from the distributors, Optech. Tel: (0252) 714340.

NEWS IN BRIEF

● **SHARP** eyed readers who may have perused the PC press recently might have spotted Computer Concepts advertising for PC Dos programmers. Speculation that a PC version of the *Impression* DTP package is planned was squashed by CCs' managing director, Charles Moir. 'It would be technically impossible to port *Impression* to the PC,' he said. However, it's known that the company's new *ArtWorks* drawing package has been structured with a view to portability. Moir added: 'I would just like to reassure everyone that Computer Concepts is not about to abandon the Archimedes software market or anything like that, but we do have to keep an eye on what's going on in the PC world.'

A positive view is that CCs' commitment with Wild Vision (see separate story) to producing multimedia products for the Archimedes has generated a requirement for PC expertise to ensure 'industry standard' compatibility is retained in the development of new products, where it is believed necessary.

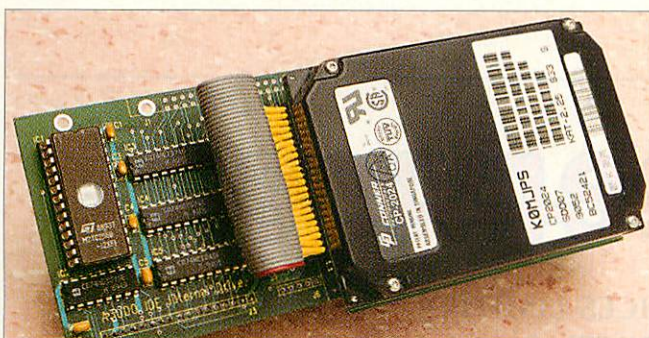
● **NORTHWEST SEMERC** (Special Education Micro Electronics Resource Centre) in Oldham has announced two special needs initiatives aimed at the Archimedes.

The first is ArcTracker, a ruggedised tracker ball for users with motor control or learning difficulties. Special buttons are provided to execute 'double-click' responses with just one press. Such users should find the ArcTracker much easier to use than a conventional mouse. It costs £269 plus VAT.

Northwest SEMERC has also been awarded NCET funding for the production of a special needs CD-Rom publication. In partnership with CD-Rom specialists Cumana, SEMERC will research and publish a CD-Rom-based special needs curriculum guide called the *Special Needs Resources Disc*.

The CD-Rom will feature high resolution photographs, diagrams and audio tracks. The target publication date is March 1983. Contact Northwest SEMERC on 061-627 4469.

THANKS FOR THE MEMORIES



One of new the A3000 internal drives from CU Electronics

NEW MEMORY upgrades for A5000 and A3000 computers plus an IDE hard drive for the A3000 have been announced by Stockport-based CU Electronics. The new 1Mb A3000 Ram upgrade is a very compact device priced at £40. The 2Mb A5000 RAM upgrade is priced at £95. The range of A3000 internal hard drives starts with the £189 20Mb unit.

Contact CU Electronics on 061-476 0576.

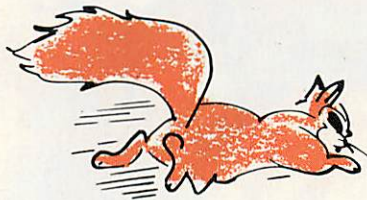
SQUIRREL

THE REVOLUTIONARY NEW
DATABASE FOR ARCHIMEDES COMPUTERS



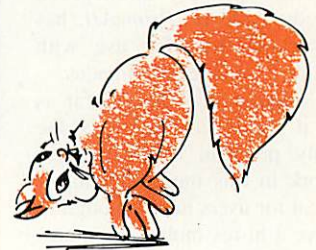
FRIENDLY

Squirrel is the easiest to use database yet, allowing simple point and click database creation and queries.



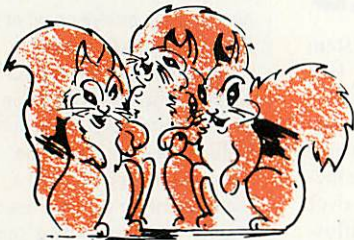
FAST

Modern indexing techniques mean superfast searches every time.



FLEXIBLE

Images, text and sound may be stored in the same database



NETWORK COMPATIBLE

Client/server design ensures that squirrel runs just as well on networks as standalone.



INTELLIGENT

Squirrel understands days of the week, months of the year and recognises files from other popular packages.



COMMUNICATIVE

Queries may be made onto other popular computers such as an IBM or Macintosh, even remotely over telephone lines.



REPORTING

Fully relational reporting with an entirely new graphic approach to data selection.



PROFESSIONAL

Quite simply, the most professional database for Archimedes users.

Single User Version

£129.00 + VAT

Econet/Site Licence

£516.00 + VAT

Suitable for Acorn A3000, A310 and A400 Series.

digital services

DIGITAL SERVICES LIMITED

9 WAYTE STREET, COSHAM, PORTSMOUTH, HANTS PO6 3BS

TEL (0705) 210600

AVAILABLE NOW

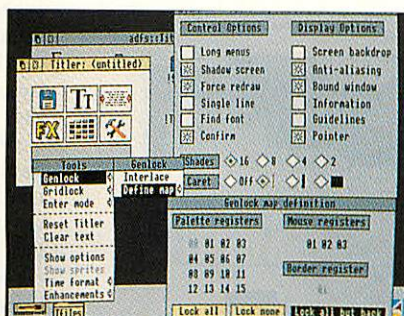


IMPROVED TITLES

CLARES has recently released a presentation package to complement their suite of graphical software for the Archimedes. *Titler* has been designed to simplify the creation of video titling and presentations. The program is divided into two main sections – *Titler* and *Sequencer*. *Titler* is used to design screens using text, sprites and draw files.

Text can be placed anywhere on screen in any outline font. Effects such as drop shadows and underlining can easily be incorporated into your designs.

Sequencer allows groups of screens to be linked together to form complete presentations. In addition, a host of other



Titler simplifies video titling and presentation

screen types can be incorporated into sequences, including *ProArtisan*, *Illusionist* and *Render Bender* files. Music and sound effects can be implemented by including *Tracker* tunes or *Armadeus* samples. *Titler* costs £127.62 plus VAT. With a Wild Vision Genlock module it costs £293 plus VAT. For our full review, please turn to page 99.

ICONS IN HI-RES MODE

ONE OF the visual differences between Risc OS 2 and 3 is the ability of the latter to display high-resolution icons in high-resolution modes.

If you look inside the most recent application directories, you'll find three separate sprite files labelled *Sprites*, *Sprites22* and *Sprites23*.

Sprites contains mode 12 sprites for low resolution modes, *Sprites22* contains mode 20 sprites for high resolution colour modes and *Sprites23* contains mode 23 sprites for the ultra-high resolution mono mode.

The suffixes 22 and 23 refer to the aspect ratio of the pixels used in a particular mode: mode 20 uses square pixels, so icons from *Sprites22* (2x2) would be displayed.

Risc OS 3 automatically selects the correct icons for whatever the mode is, providing they are included in an application. None of this information is mentioned in the documentation supplied with the A5000 (the only machine at present to have Risc OS 3).

Another Risc OS 3 'secret' is its ability to alter the appearance of windows themselves. Buried deep inside the Apps

directory (which is part of Risc OS 3) is a sprite file containing all the shapes necessary to 'build' windows. It can be transferred from Rom on to disc by the following actions.

First, open the root directory of Apps by pressing the menu button over the Apps icon and select Open '\$'. Open the Resources directory by double clicking on it and then open the Wimp directory by doing the same. Copy the sprite file Tools by dragging from the Resources file window to another file window, such as a floppy disc.

Like application icons, different sprites are used depending on the mode you are in, so each sprite in the Tools file is suffixed with a number denoting the pixel ratio used. Any sprite can be altered using *Paint* and then re-saved. It is of course impossible to save a file to Rom, so the new Tools file is saved inside the System directory on a hard disc.

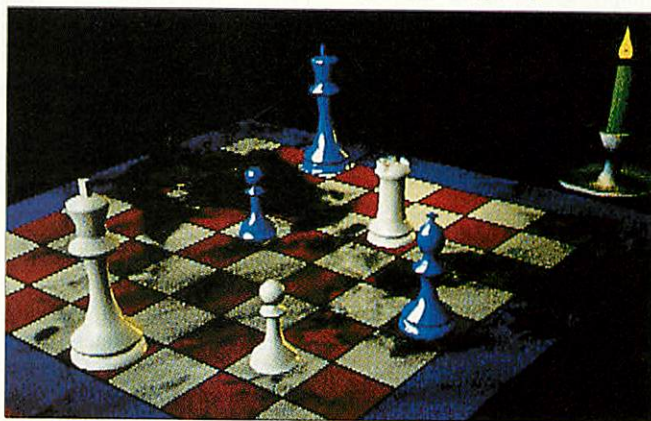
An altered Tools file (with new 22 sprites) has been included on this month's subscriber's disc for you to create your own. It also contains sprites not found in the original Tools file.

READER PIC OF THE MONTH

CHESS seems to be the theme for our pic of the month slot this month. The picture of the chess board below comes from David Hoskins and was produced with *Illusionist*, the rendering application. It is not

ray traced believe it or not.

David was actually responsible for writing *Clares' Render Bender 1 & 2* and *Illusionist* programs so its no wonder that he can produce such stunning images.



NEW PRICE FOR PRO-IMAGE

IRLAM Instruments have reduced the price of their Epson flatbed scanner following new pricing policies from Epson. Irlams A4 ProImage scanner is now £999.

Also, due to the enhanced parallel interface found on the

A5000, owners of Acorns newest machine do not need to buy the IEEE interface card; this saves £98.50. Users however might like to buy a printer switching box which costs £26.30. Irlam Instruments, (0895) 811401.

SUPER DRAW READY

4MATION's 'super Draw' program, *Vector*, is due to be released shortly. Based around the well-known public domain program, *Draw1½*, the 4Mation program has all the tools provided in Acorn's *Draw* and much more.

An on-screen help facility gives information regarding which tool is currently selected and what the last action was. For example, typing in a line of text will give a message saying what font has been used, the size of font and the position of the text.

A library is used to store commonly used objects and this is held within the *Vector* application directory and can be added to at any time. Different libraries can be loaded with *Vector* depending on the type of drawing being produced. A circuit design library, for example, might contain a selection of different component symbols used in such a diagram.

Layering allows a drawing to be split into a number of separate parts, each of which can be super imposed on to the complete design. Each layer can be coloured differently to help distinguish them from the others in a drawing. Alternatively, any layer can be viewed on its own.

Although *Vector* is written to work on any 32-bit machine, auto-kerning for text, sprite and text rotation, colour dithering and the text-to-path tool will only function with Risc OS 3.

However, 4Mation does not see this as a problem as the company expects the majority of users to upgrade their machines when Risc OS 3 becomes more available.

Vector will cost £85 plus VAT (a site licence is included in the price). For further information, contact: 4Mation, 14 Castle Park Road, Barnstaple, Devon EX32 8PA. Tel: (0271) 25353.



SPEED IS OF THE ESSENCE

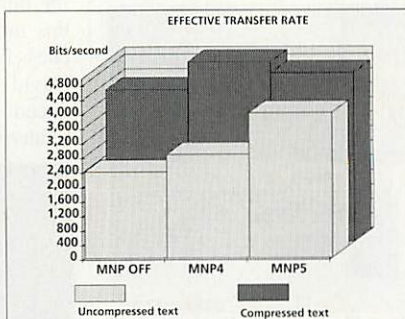
IF you use a modem which features error corrections and compression, then it may be news to you that your transmission rate could be doubled, simply by changing the way that you transfer files.

It is important to know how to set up your modem correctly according to the type of file you want to up or download. The graphs show the same text file transferred in two different forms; compressed and uncompressed, the former using David Pilling's *Spark* utility.

It may seem obvious that a 30K text file compressed to 16K will take just over half the time to be up or downloaded compared to the same uncompressed file. According to graph showing the effective transfer rate, that's how it is if your modem either has no compression facility (MNP5 or

V42bis) or compression is switched out. Turn compression on, in this case MNP5 and look what happens – the effective transfer rate of the compressed file falls slightly, though the uncompressed text file transfer speeds up as you would expect. The explanation is simple – MNP5 can't compress an already compressed file but it can waste time trying.

The graph showing measured transfer rates shows the physical number of bits per second that pass between the two modems, and suggests that the uncompressed text file is way ahead in terms of speed under MNP5, but in reality the compressed file is the most efficient form for file transfer as long as compression is switched off. Incidentally, the two graphs illustrate a marked speed benefit between MNP4 (error correction mode) and no MNP settings. This is because when MNP is on communi-

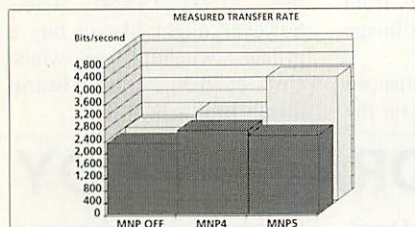


Comparing effective file transfer rates

cation is synchronous, or clock driven and start and stop bits required in asynchronous mode can be discarded, giving a useful 20 percent reduction in data transmission volumes.

As a general rule, if you're logging on to a host system offering MNP connection, MNP5 is best for just looking around or transferring uncompressed files if you have to. For ultimate file transfer speed, ensure your files are compressed and MNP5 is switched off, but MNP remains on.

Our example shows a typical best case of almost 5,000 bits per second – more than double the rated speed of the modem. Some compressed files will go even faster!



Comparing measured file transfer rates

THE BB OF THE MONTH

THIS month I have chosen to take a look at Rich in Paradise BB which supports the Fido network. The file areas are neatly indexed for ease of use and contain such headings as comms, sound samples, demos, Draw files, games and utils. There is also an area for BBC B files, although at present there are not that many BBC files available. There are

also numerous message areas with some amusing and lively chat, including a Wots on in Bristol and Wots on in Bath echo conference. Other topic areas include broadcasting, jokes, educational and school news, programming and adverts. Being a member of Fidonet

allows Richard to include the Acorn support database area which many bulletin boards are now sharing. Rich In Paradise is run by Richard Paddle and is based in Paignton. It caters for all speeds up to v32bis and HST, including v42bis. Rich in Paradise can be called on (0803) 666808 with your comms software set to ANSI, 8N1.



Get Rich in Paradise!

STAR-NET UPDATE

REGULAR readers of this column will no doubt be familiar with Star-Net, which incorporates School-Net. Now Paul Welbank, the Sysop, has expanded the system to include Fidonet echos and extra support for schools.

School-Net UK consists of 12 channels devoted to ongoing inter-school projects covering such topical subjects as weather data collection, global village news and a Star Trek role playing game.

School-Net can be accessed on (0603) 507216 set to 8N1 and further information, including a printed newsletter, can be obtained by writing to Paul Welbank, Eaton (City of Norwich) School, Norwich NR4 6PP.

NEWS IN BRIEF

● **MIRACOM** has just announced a new improved version of its popular WS3000 v22bis modem. Featuring MNP levels 4 and 5 and retailing at £345 plus VAT, Miracom is aiming the new modem at the 'casual cost-conscious modem user'. The standard WS3000 will now retail for £195 plus VAT. For the more enthusiast comms user, Miracom has also launched a range of V32bis modems. The Courier V32bis costing £695 plus VAT is now 50 percent faster than the standard Courier V32 at £595 plus VAT. Contact Miracom on (0800) 225252.

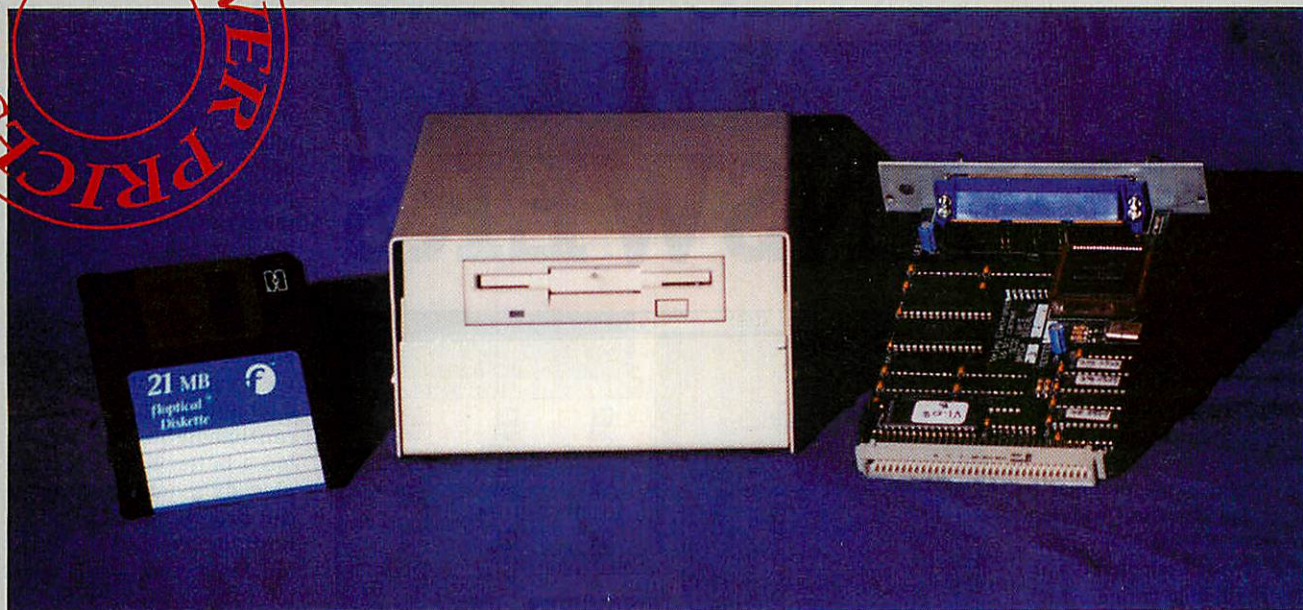
● **HAYES** has just announced details of several new modems. The new Ultra range starts with the Ultra 24 with Express 96. This is a V22bis modem that can connect to all V21, V23, V22 and V22bis modems, in addition to any other Express 96 modem, to allow V42bis data compression. This can provide an effective throughput of up to 25,000 bps. Their top model is the Hayes Ultra 144 – a full V32bis (14,400bps) modem.

● **ANDEST** Communications has just launched the first truly portable V32 modem. The RoadRunner Quin Fax modem features all speeds up to V32, includes V42bis and MNP4 & 5 and can even send and receive faxes. Costing £599 plus VAT, the surprising thing is its size; hardly bigger than a cigarette packet. Contact Andest Communications on (0908) 263300.

● **SADLY**, from April the Orb BB will be closing down. For five years, Orb has been the HQ for the XFS BBC B host system. Two systems still supporting XFS are Viking East Anglia on (0255) 503048 and Connections BBs in London, on 081-903 1309.

● **THE** French Minitel system is set to expand into the Netherlands. French Minitel users will also be able to link up with Dutch videotex services by dialling 3619 – the number of the international Teletel kiosk.

Every few years a product comes along



which changes your whole perspective.

THIS REMARKABLE new disc drive gives users an amazing 21MB of space on each special floppy disc. The drive works by utilising an optical tracking system which finds space between the grooves on the disc, with the information being stored magnetically as on a standard floppy diskette.

THE DISCS are interchangeable so realistic, unlimited storage capacity is available for floppy disc drive users for the first time.

THE DRIVE is also capable of formatting

the normal double and high density discs to its own format so you can also utilise your existing discs. By using Morley Electronics own SCSI interface card and software the drive appears on the icon bar as a hard disc drive and can then be used to store data just as with a hard or floppy disc.

DATA can be copied to and from other drives just as you would normally and all of the usual RISC OS functions can be carried out.

WE BELIEVE that this drive represents the next step forward in data storage and are

offering the drive complete with our own SCSI interface card at the following prices.

Available for the A3000 and higher

External 21MB Mechanism	£499.00
Internal 21MB Mechanism	£425.00
Extra Floptical Disc	£25.00
5 Floptical Discs	£100.00

Please state computer type when ordering
Mechanism prices include SCSI Interface card, software, all cables and case, manuals and one 21MB Floptical disc.
All major Credit Cards Accepted

MORLEY

E·L·E·C·T·R·O·N·I·C·S · L·T·D

Morley Electronics Ltd, Morley House,
West Chirton, North Shields,
Tyne & Wear. NE29 7TY

Tel (091) 257 6355
Fax (091) 257 6373

Q Chris Brett of Surrey has a problem printing *Draw* files using an Epson LX400 and asks if there is any way of positioning the drawings at the top of the page without the printer ejecting a blank page of paper first.

A By default, *Draw* will position your diagram in the bottom left hand corner of the page, so before you start to use it ensure that you move the scroll bars to the top of the paper. Also, make sure that you have selected the correct paper size that you want to print out to. This is usually A4, but can be changed from *Draw*'s Paper limits menu.

From the same menu it is also worth checking whether you have Portrait or Landscape mode selected. This option will determine which way up the picture will be printed – either horizontally or vertically.

Lastly, after loading your printer driver, selecting Show from the Paper limits menu will actually show you the printer driver margins as a grey area around your *Draw* window. This will let you see if any parts of your diagram fall off the physical page set by the printer driver's defined page size.

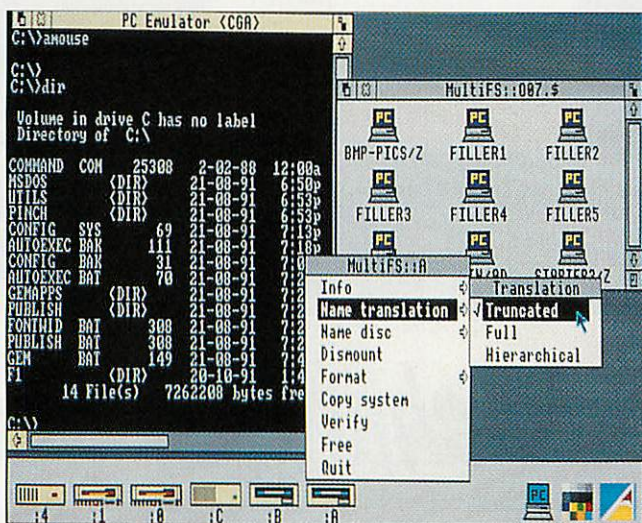
Of course, because this is not printed, it can also be quite useful for use as a scratch pad.

Q Mr Brannan of North Humberside asks if it is possible to play games using Atari type joysticks on an Archimedes and if so, where does the interface plug in?

A QD Enterprises manufacture such an interface, allowing you to plug in two standard Atari joysticks. The interface plugs into the Archimedes' parallel printer port and not the serial port.

There has been some confusion over where it plugs in because the company The Serial Port was originally part of QD Enterprises who sell the joystick interface, hence it was referred to as The Serial Port joystick

QUESTIONS AND ANSWERS



The PC Emulator: how do you sort out the display problems?

interface. These two companies are now, in fact, separate. The Serial Port is still based in Wiltshire (0749 670058) and sells the popular communications package, *ArcTerm7*, together with a range of hard drives. You can order items via The World of Cryton BB.

QD Enterprises now encompasses new label Vertical Twist also based in Wiltshire (0373 824200) and is selling existing products such as the joystick interface, and the Peats graphics enhancer. The joystick interfaces provides a small switch to toggle between the printer and joysticks, so that you don't have to keep unplugging the leads when you want to use your printer.

Q Paul Badham of Stafford has an interesting query regarding software protection and would like to know how to copyright a program that he has written.

A This is actually quite simple, as any program is automatically your copyright as soon as you write it. Including a REM line near the beginning will clarify this fact to anyone who actually lists the program.

One popular way of copyrighting a program is to send a copy of the program disc through the post to yourself, using recorded delivery. Then keep the package in an unopened condition. If anyone copies your program and tries to make it theirs, you can provide proof that you had the program on a date prior to them.

Q Mr B. Clarkson of Western Australia has encountered some problems using a Canon BJ330 printer plugged into his Archimedes A410 via a Computer Concepts dongle, used to run *Impression*. He asks why his printer should lock up if it is off-line when Print is selected

from the Archimedes, and then turned online after the Archimedes has started printing.

A The answer here probably lies in the fact that when the Archimedes starts printing, the first thing it does is send all the control modes to the printer to set it up. For example, if you are printing graphics, it first sends the control codes to tell the printer to go into graphics mode, set the dot resolution, line spacing etc.

It then starts sending the picture itself. As the computer is capable of sending data a lot quicker than the printer can handle it, the computer has a buffer to hold any surplus data until the printer can process it. If the printer is offline, then the buffer will quickly become full, resulting in the computer hanging up. Sometimes, turning the printer on now will result in some of the initial control codes being lost, which will mess up the printout. If you press ESCAPE at the Archimedes end, you should be able to flush the buffer and unfreeze the computer.

To reset the printer, as it is still under the computers control, is to turn it off and on again. You may then get a few lines of garbage printed as the computer clears the remaining data in it's buffer, but you should now be able to ensure the printer is online before starting the print again.

Q Mr T. Bauer from Glasgow would like to know why his Archimedes A3000 displays barely comprehensible graphics while trying to run PC software under the *PC Emulator*.

A Firstly, you need to check which version of the *PC Emulator* you have. There are three versions currently available; the original non-Wimp version and two new Wimp-based versions – one for 1Mb machines and the other for 2Mb or greater machines.

The former two will only support CGA graphics,

whereas the latter will display CGA, EGA or 99 percent VGA graphics (see the configuration menu for default). Having checked to see which type of graphics you are using, you should examine your PC software to see if it has a graphics configuration program accompanying it.

Run this and select a graphics mode to match that used by your *PC Emulator*. If in any doubt, start with a basic one and if that works, you can always move up by experimentation.

Q Mr J Coles of Rickmansworth is studying Greek and would like to know if it is possible to print Greek characters using an A3000 running *Pipedream*, equipped with a Panasonic KXP1124 printer. He has managed to obtain the required characters on screen but unfortunately they don't appear on paper when he tries to print them out.

A There are two possible solutions here. Either using the *Pipedream* drivers or by using the standard Risc OS printer driver, *PrinterDM*. The former will only work if your printer is capable of displaying Greek characters, which your printer manual will tell you.

If it can, you can edit *Pipedream*'s printer driver

HANDY TIP

Andrew Blythe from Droitwich has sent in a handy tip, solving April's problem which Mr Ellis was experiencing with slow output when printing from *Pipedream* to a printer driver.

Andrew suggests selecting the print to file option from the printer driver before printing the document from *Pipedream*. This saves the data to disc much quicker than printing it on paper.

You can then set the printer back to parallel and drag the printer file just produced onto the printer driver icon. This will then print the file as a background task so that you can still use the computer while the lengthy task of actually printing is carried out.

by loading it into *Edit* and comparing the character translation table at the end, with those values given in the printer manual.

If you decide to use Risc OS printer driver, then you will need to install some fonts first, by double-clicking on the *Fonts* directory and then telling *Pipedream* to use the Risc OS driver, from the CTRL PD menu.

By using the Risc OS driver, any characters on screen will be sent to the printer to be printed.

Q Mr A. Green from Wigan asks if he can load BBC Master ADFS discs by using an external 5.25in drive plugged into his Archimedes A3000 and Watford external disc interface.

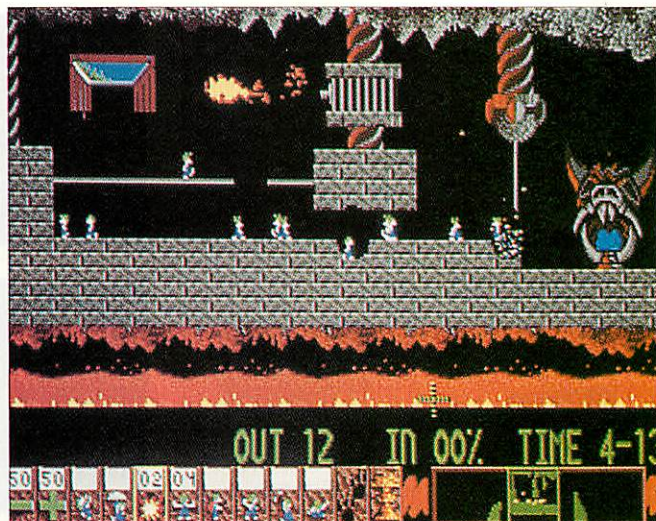
He also asks what will happen to the drive numbers when using this setup.

A If you plug an external drive in via an interface, configure an extra drive by typing *CONFIGURE FLOPPIES 2 followed by return and then perform a CTRL-BREAK to initialise them. You can then click on the second drive icon to access the external drive in exactly the same fashion as the internal drive.

If you ensure that any switchable drives are set to 80 track, you can then access BBC Master ADFS format discs with no additional hardware or software. However, remember that Master discs are in Archimedes L format and thus only hold 640K of data. If you try copying a standard Archimedes disc onto one, you may get a disc full message. You should also be able to access MS-Dos 5.25in discs via the PC Emulator.

Q James Pattinson, aged 11, of Sevenoaks is a *Lemmings* fan and having played the five level demo on the free games disc (*BAU* November 91) he is thinking of upgrading to the full 128 level game.

He would like to know if the passwords to select each new level are the same as his friend's Amiga version.



Lemmings: 128 levels of pure mayhem, but do you want to cheat?

A Unfortunately, the passwords on the Archimedes version are different to other versions, so you can't cheat that way. However, the passwords are fairly readily available from public domain libraries and bulletin boards.

But do you really want to cheat? Surely you will feel much better completing the game knowing it was all your own effort!

Q Mr Newcombe of Cheshire has extended his range of Archimedes fonts by reading the article in *BAU* March 1992.

However, he has two queries; he asks how to obtain a new icon for any additional font directories on his hard disc. Secondly, he reports that *FontFX* has trouble recognising the new fonts.

A To obtain the correct icons for second and subsequent font directories, copy the file called *!Sprites* from the original font directory into each of the new directories. Load each one into *Paint* and rename the sprites so that they match the name of the directory. If your new font directory is called *!Newfonts*, rename the sprite to *!Newfonts* and then resave the sprite file. Next time you catalogue the disc, the icons should be correctly displayed. You should also do this to the *sm!Font* sprites, which is displayed in Full Info or Small Icons windows.

The second problem seems to lie in your version of *FontFX*. Try contacting The Data Store on 081-460 8991, as versions later than 1.50 work correctly with multiple font directories.

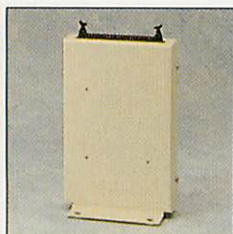
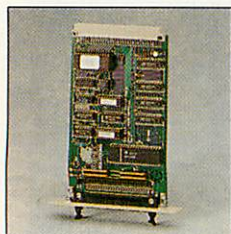
HELP US TO HELP YOU

The Questions and Answers page is your chance to have your problems solved. They can be on any topic – you name it and we'll try to solve it. Please send your questions, whether technical or otherwise, to:

Questions and Answers
BBC Acorn User
20-26 Brunswick Place
London, N1 6DJ.

We are happy to answer your queries on these pages, but regret that we are unable to send personal replies to questions sent in. If you send a disc, please put your name and address on the disc itself. It is also useful if you could include full details of your machine. Please enclose an SAE where necessary and mark on your envelope whether you use a BBC eight-bit micro or 32-bit BBC A3000, Archimedes or A5000.

If it's got to work...



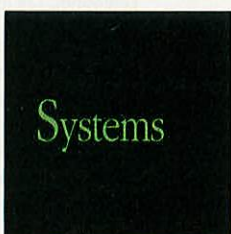
16-bit SCSI Interfaces	
A3000	£98.00
A300/400/500/5000	£98.00
CDFS Upgrade	£45.00

Worra Winnie Internal Hard Discs	
A300/400/500/5000	
50 Mb	£299.00
100 Mb	£449.00
200 Mb	£735.00



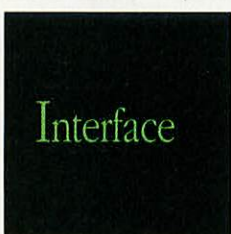
Worra Winnie External Hard Discs	
A3000/A300/400/500/5000	
50 Mb	£345.00
100 Mb	£495.00
200 Mb	£780.00

High Speed Internal Hard Discs	
A300/400/500/5000	
50 Mb	£339.00
100 Mb	£489.00
200 Mb	£775.00



High Speed External Hard Discs	
A3000/300/400/500/5000	
50 Mb	£389.00
100 Mb	£539.00
200 Mb	£825.00

Elite External Hard Discs	
A3000/300/400/500/5000	
50 Mb	£489.00
100 Mb	£639.00
200 Mb	£925.00
300 Mb	£1345.00
680 Mb	£1795.00



Worra Tape Streamer	
60 Mb	£595.00
150 Mb	£795.00

High Speed Tape Streamer	
60 Mb	£765.00
150 Mb	£895.00

Elite Tape Streamer (DAT)	
1 Gb	£1750.00

Magneto Optical R/W Drive	
560 Mb	£3650.00

CD ROM Drives	
Worra CD	£299.00
High Speed CD	£399.00

Prices shown include SCSI interface (except CDROMs which require SCSI card and CDFS upgrade).
Always state computer type when ordering

Prices exclude £10.00 p&p

and VAT



...it's got to be one of ours

The new Worra CD ROM drive offers a low cost entry into the world of multimedia with performance comparable to similar drives. The High Speed CD ROM drive offers the highest possible performance and is better able to cope with more demanding applications, such as Acorn 'Replay' sequences, than cheaper drives.

Each hard disc comes complete with the following FREE software:

Genesis, Euclid, Disc Tree, RISC OS Companion, Worra Battle

Oak Solutions Ltd. Suite 25 Robin Enterprise Centre
Leeds Road Idle West Riding of Yorkshire BD10 9TE
Tel: 0274 620423 Fax: 0274 620419

Telephone for
Education Prices

(and we'll knock off the cost of your call!)

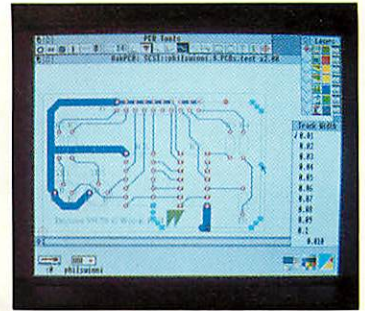
QUALITY

RELIABILITY

Oak PCB

£99.95

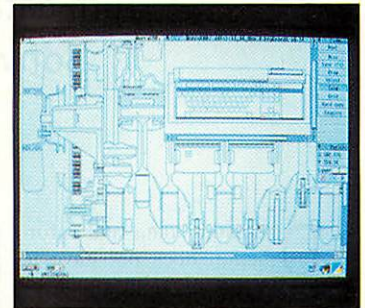
Oak PCB is a brand new RISC OS compliant PCB and schematic design package. A multi-tasking desktop user interface based on !Draw ensures that users can quickly exploit the powerful draughting features, and create complex multi-layer circuit boards or schematics. Output is to RISC OS printer drivers, or the plotter driver supplied. Features Drawfile import/export, associative editing, drilling data, solder resist etc. etc. Supplied with comprehensive PCB and Schematic libraries.



WorraCAD

£99.95

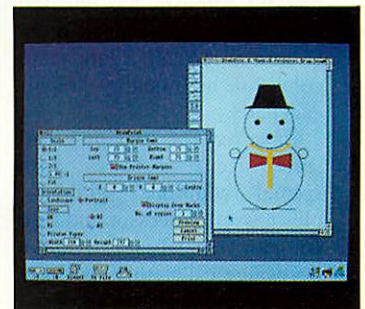
WorraCAD is the de-facto standard RISC OS 2D CAD package. Working to 18 significant figures precision, WorraCAD provides all the tools required to produce superb accurate technical drawings. Outputs to plotters and RISC OS printer drivers. Features tangents, normals, intersections, parallels, automatic associative dimensions, grid, Drawfile export, linestyles, 16 layers, hatching, mirroring and stretching. CNC link available to Boxford Lathes. Libraries available seperately.



Draw Print & Plot

£39.95

Draw Print & Plot supercedes our earlier plotter drivers for Drawfiles (WorraPlot and ArcSign - upgrades available). DrawPlot accepts drawfiles and creates output on HPGL compatible plotters. Features outline fonts, sprites, filled areas, line thickness and depth sorting to avoid colours overlapping. DrawPrint accepts drawfiles and allows them to be printed to RISC OS printer drivers at a different scale - for example to create huge posters (cropmarks are created automatically).



KiddiCAD

£69.95

KiddiCAD is an exciting 3D building block package designed for younger users. 3D models may be created, using the library of building bricks supplied, and rotated in real time. The high speed of operation and the live 3D view allows users to quickly gain an understanding of work in 3D. Models may be output as Spritefiles in colour or wireframe mode, and can then be imported into painting packages, DTP, Genesis etc.



Leaders in CAD for the Archimedes

prices exclude P&P (£1.50) and VAT



COMPATIBILITY

PERFORMANCE

FREE DISC

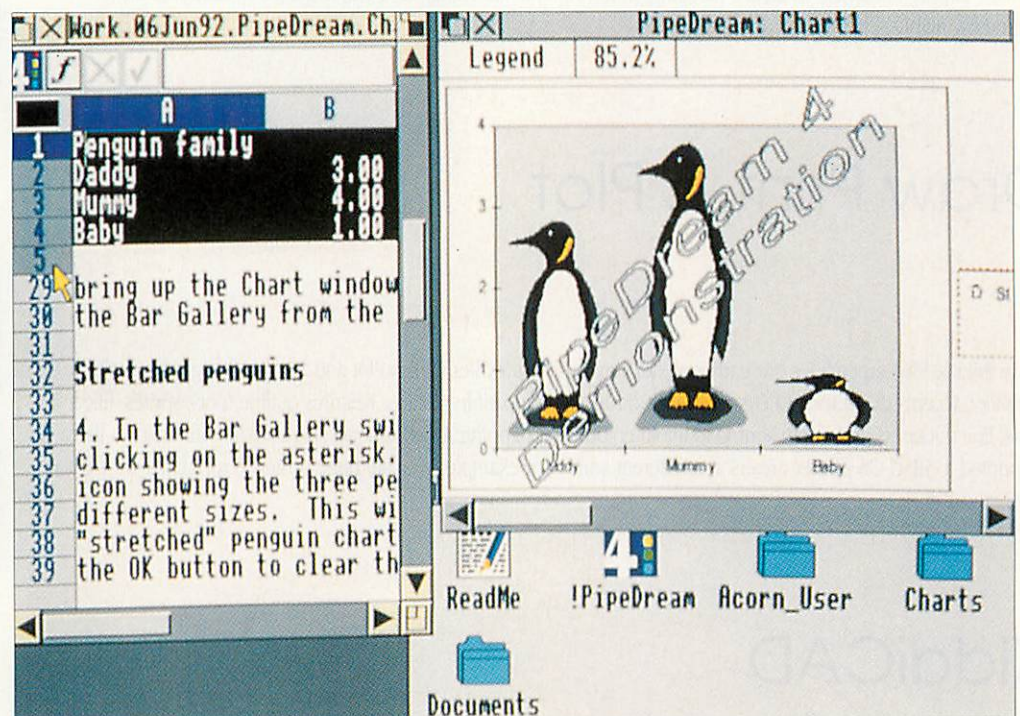
PENGUIN POWER

Turn data into exciting visuals using the demo disc of Colton Software's *Pipedream 4*, FREE with this month's issue

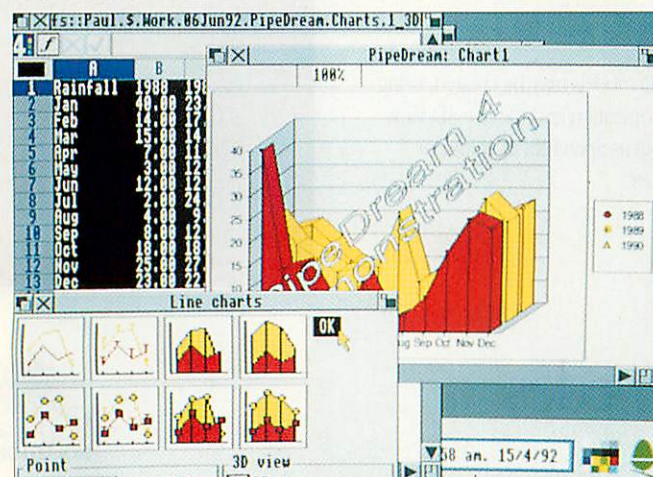
Presenting data and information does not have to be boring – all you need is the right software package to run on your BBC A3000 or Archimedes.

Many Arc users may be familiar with Colton Software's *Pipedream* package – now the company has released version 4 which allows users to turn facts and figures into colourful, high-quality graphical charts.

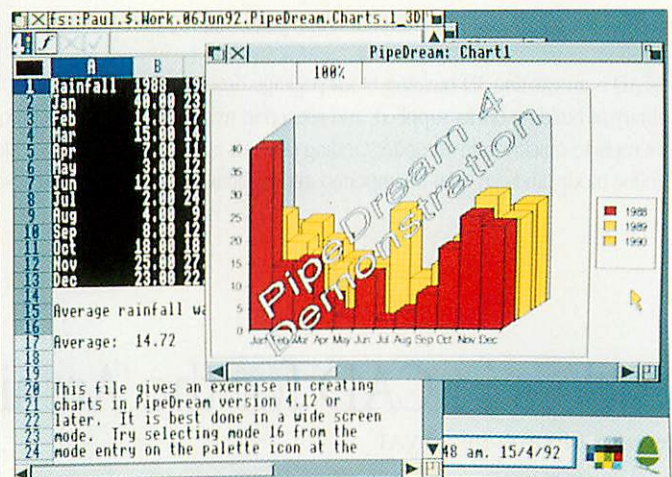
Pipedream 4 is a powerful spreadsheet package with special additional graphics, plus a word processor and fast, compact database. Colton Software calls this package 'the works' – and looking at the facilities it offers, it is not difficult to see why. This month we are giving readers the chance to sample this versatile package by using the FREE demo disc on the cover of this month's issue.



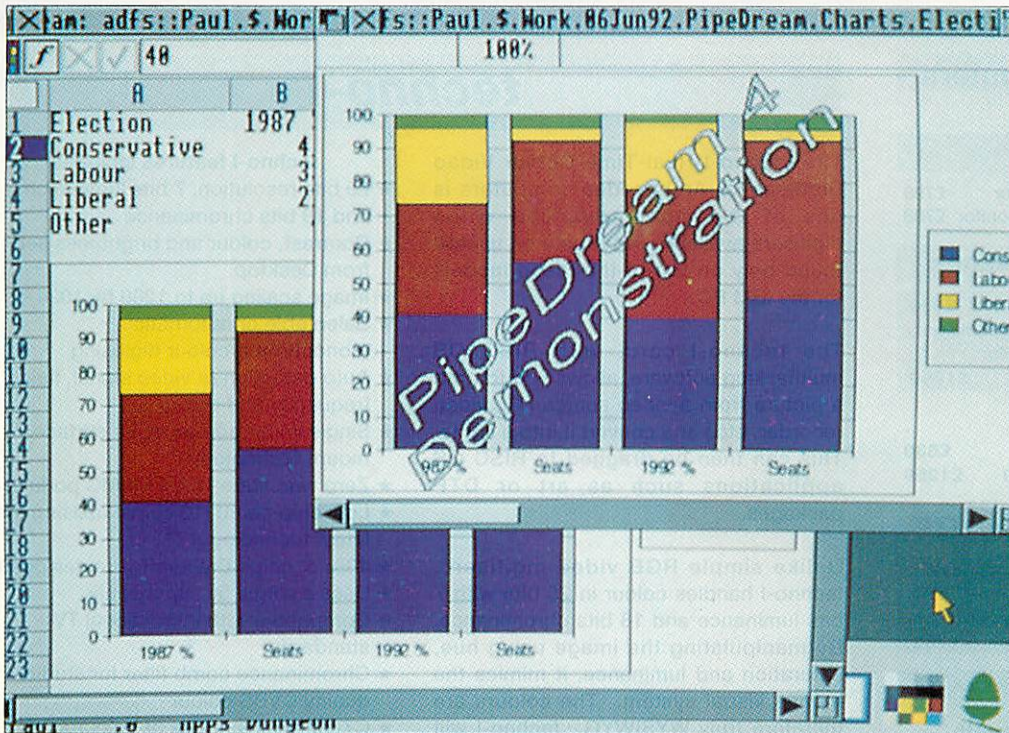
Penguin Graphics, a key feature of *Pipedream 4*, can help enliven your documents and reports



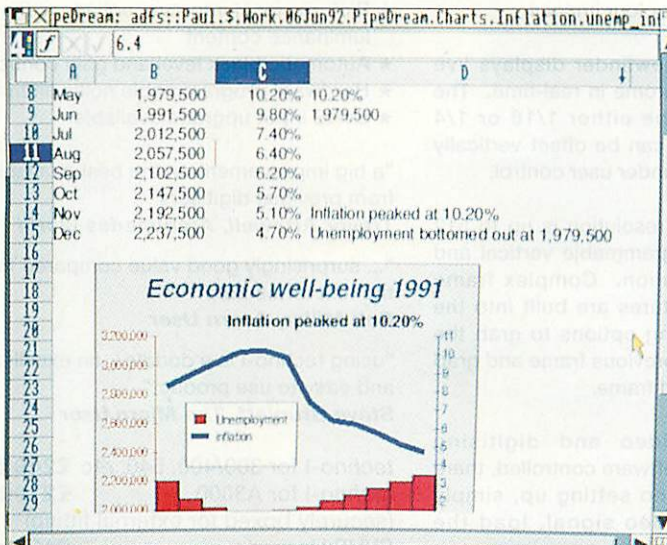
Follow the simple exercises in the Charts folder on the disc...



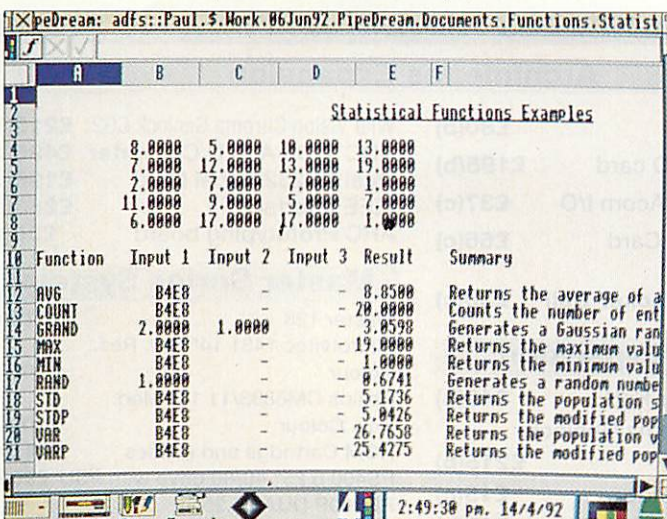
...to create 3D charts in various colours for maximum impact



Use your Archimedes to produce Peter Snow-like election graphics using the Charts folder



Combine statistical and presentation elements for your documents



An example from the Documents folder showing statistical functions

Not only that, we are inviting readers to produce their own presentations using the *Pipedream 4* demo disc and send them in to us. We will award free subscriptions to *BBC Acorn User* for the best and publish them in a future issue.

The full version of *Pipedream 4* includes a flexible word processor which allows you to use fonts and pictures to create stunning presentations of your letters and reports.

The spreadsheet facility allows background recalculation so you can carry on working while it computes. There are 160 built-in functions, plus a programming language for your own customised operations. There are also arrays within slots for easy manipulation of structured data.

Dynamic charts can be created straight from your data. And personalised Penguin Graphics allow bars to be filled by your own draw files to enliven your data.

The fast and compact database offers full sorting, search and selection facilities and you can link straight to the word processor for printing mailshots and labels.

WHAT'S ON OFFER?

The FREE demo disc allows you to explore some of the many capabilities of *Pipedream 4*. Here is a list of what is included:

- The *Pipedream 4* demo program.
- A Charts folder, including examples of charts, 3D bars, Penguin Graphics, and other examples and pictures.
- A Documents folder, with a variety of document examples and functions. There is also useful advice for users of *Pipedream 3*.

You can only run the *Pipedream 4* demo disc on a BBC A3000, Archimedes or A5000 which has 2Mb of Ram or more. The full version of *Pipedream 4* costs £196 plus VAT (educational discounts and site licences available on request).

For a free brochure on the *Pipedream 4* package, please contact: Colton Software Ltd, 2 Signet Court, Swanns Road, Cambridge CB5 8LA. Tel: (0223) 311881. Meanwhile, enjoy using the demo disc.

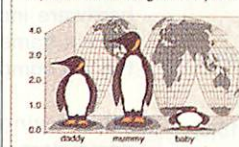
FREE BOOKMARK

Watch out for a free *Pipedream 4* bookmark (shown here), which you can find inside next month's issue of *BBC Acorn User*.

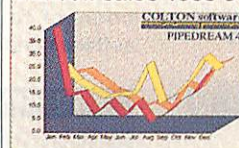
PipeDream 4

...the works

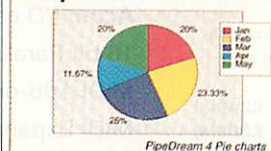
PipeDream 4 Penguin Graphics



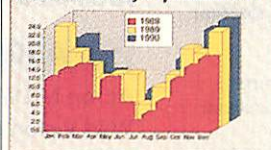
Ribbon sales 1988-90



Simple Simon Pie sales



Isobar chart by PipeDream 4



Colton Software

TELEPHONE:
081-205 9558
FACSIMILE:
081-205 0190

TECHNOMATIC

TECHNO HOUSE,
468 CHURCH LANE,
LONDON
NW9 8UF

Archimedes Computers

Carriage £8/computer £12/system

A3000

A3000 with 2Mb RAM Acorn monitor £798
A3000 with 2Mb RAM CUB 3000 monitor £788

Learning Curve Packages

A3000LC 1Mb + Acorn monitor £850
0% finance available on these packages
A3000LC with 1Mb + Acorn monitor
Acorn 300 dpi inkjet printer £1089

A3000LC with 2Mb RAM and
CUB 3000 monitor £830
A420/1 LC with 4 Mb and Cub 3000 £1259

NEW A5000 Learning Curve

2Mb RAM, expandable with 4Mb + 40Mb HD
with Acorn multiscan monitor £1531
0% finance available on these packages
A5000 LC with 300 dpi inkjet printer £1765

A540

ARM3 + 100Mb SCSI HD, fitted with 8Mb
RAM (upgradable to 16Mb)
A540 plus Taxan 795 £2855

0% Finance on Learning Curve SCHEME MUST END JUNE 30th

Subject to status. Ring for personal quotation.

techno Tablet

Now 3 models to choose from:

technoTablet 9 £109(b)

9" x 6" tablet with captive 3 button stylus,
perfect for sketching and for special needs
applications.

technoTablet 12 £179(a)

The original 12" x 12" technoTablet with 4
button pluck.

Optional Stylus for technoTablet 12 £15(c)

technoTablet 18 £329(a)

A new 18" x 12" tablet which will allow tracing
of drawings up to A3. 3 button stylus as
standard.

techno SCSI Packages

300/400

Single width card for internal or external
drives.

Internal are complete with all fittings, external
feature compact, professional cases and
screened cables.

47 Mb internal + card £249(a)
105 Mb internal + card £389(a)
Optional external terminator £12(d)
47 Mb external + card £339(a)
105 Mb external + card £469(a)

A3000

8 bit internal card with User Port. External
drives are housed in compact, professional
cases with screened cables.

47 Mb external + card £339(a)
105 Mb external + card £469(a)
Optional external terminator £12(d)

techno-I

The techno-I Real-Time Colour Video
Digitiser for Archimedes computers is
one of the most advanced video
digitisers available, with features usually
found only on top-of-the-range models
for the IBM PC.

The techno-I card, with RISC OS
multitasking software, allows you to grab
a picture from a video source (TV, video
recorder, etc.) and convert it into a sprite.
This can then be dragged to RISC OS
applications such as art or DTP
packages.

Unlike simple RGB video digitisers,
techno-I handles colour in 25 bits with 7
bits luminance and 18 bits chrominance.
By manipulating the image using hue,
saturation and luminance, it mimics the
human visual system. The colours are
therefore truly WYSIWYG. techno-I will
also give true monochrome
representation of colour images.

The on-screen viewfinder displays live
colour or monochrome in real-time. The
viewfinder can be either 1/16 or 1/4
screen area, and can be offset vertically
and horizontally under user control.

The frame buffer resolution is up to 512
by 512, with programmable vertical and
horizontal resolution. Complex frame
manipulation features are built into the
hardware including options to grab the
current frame or previous frame and grab
the last completed frame.

All viewing, video and digitising
parameters are software controlled, there
are no presets, no setting up, simply
connect to a video signal, load the
software and digitise!

techno-I features include:

- ★ 25 bits resolution, 7 bits luminance
and 18 bits chrominance
- ★ Contrast, colour and brightness set
from Desktop
- ★ Image scaling up to 1280 by 1024
- ★ Selectable or automatic
monochrome/colour digitising
- ★ Auto detection of video signal, field
frequency and colour
- ★ Single width podule using surface
mount technology
- ★ Zero wait state 16 bit MEMC podule
- ★ Low chip count (13 chips) utilising the
latest technology
- ★ 40% of chips Brainsoftware designed
- ★ Uses a single 5v supply only
- ★ Compatible with international TV
standards
- ★ Chrominance comb filter for studio
quality CVBS colour
- ★ CTI sharpens edges of coloured
objects
- ★ Picture signal improver enhances the
luminance content
- ★ Automatic black level and gain control
- ★ Hardware programmable noise filtering
- ★ SVHS input upgrade available

"a big improvement on the best available
from previous digitisers"

Trevor Attewell, Archimedes World

"... surprisingly good value compared to
the rest of the field"

Rob Millar, Acorn User

"using techno-I is a doddle .. an excellent
and easy to use product"

Steve Brunlett, The Micro User

techno-I for 300/400, 540, etc £249(b)

techno-I for A3000 £279(b)

(securely boxed for external fitting)

SVHS Upgrade £100(d)

NO PRINTED PICTURE CAN DO IT JUSTICE! - Send for FREE Demo Disk

Archimedes Expansion

Acorn I/O card	£80(b)	Wild Vision Chroma Genlock CG2	£215(b)
16 bit Parallel I/O card	£195(b)	ADC 1208 A to D Converter	£495(b)
MIDI Add-on to Acorn I/O	£37(c)	Dual RS232 Serial Card	£195(b)
MIDI Expansion Card	£66(c)	IEEE Interface	£283(b)
		ARC Prototyping board	£35(c)

Archimedes Tracker Ball £30(c)

A3000 Expansion

Acorn MIDI/User Port	£49(b)
Wild Vision Chroma Genlock	
CGI	£215(b)
Serial Port Upgrade	£15(c)
A3000 Monitor Stand	£17(b)

Master Series Systems

Master 128	£379(a)
Microvitec 1431 14" Std. Res.	
Colour	£169(a)
Philips CM8833/11 14" Med.	
Res. Colour	£209(a)
ROM Cartridge and utilities	£12(d)
PS400 5.25" 40/80 drive with PSU	£90(b)
PD800P DUAL 5.25"	
40/80 drive with PSU	£166(A)

Tel: 081-205 9558

Fax: 081-205 0190

technoSCAN II**Probably the definitive monochrome scanning package!**

The all NEW technoSCAN II package provides full monochrome operation at 400 dpi as well as 8 and 16 level grey scale scanning and provides the following features:

Suitable for all Archimedes micros and integrates fully with the multitasking RISC OS environment.

Advanced memory management system releases memory when not required allowing scanning and DTP in a 1Mb computer.

Flexible zoom control allows palettes to be imported, tailored and resaved with more powerful tone and tinting features than most painting packages.

Interactive help and a superb manual.

Direct printing with RISC OS drivers.

Saves sprites direct into PAINT and DTP or to disk.

Saves sections and palettes into any graphics mode.

At the same low price as the well tested original.

technoSCAN II complete with interface card and manual **£149(b)**
 technoSCAN II for A3000 **£175(b)**
 technoSCAN II upgrade for techno SCAN **£22.50(c)**

Archimedes Monitors

Acorn 14" Medium Resolution, Colour with Stereo Sound **£209(a)**
 Philips CM8833/II Med. Res. Colour, Stereo Sound, 1 year's on-site maintenance **£209(a)**
 Taxan 770+LR Multisync High Res. Low Radiation Colour **£399(a)**
 Taxan 795 Flatscreen Multisync. Hi. Res. Colour with VIDC Enhancer **£399(a)**

Archimedes Printers**Dot matrix**

Epson LX400 9 pin 150cps **£105(a)**
 Epson LQ200 24 pin 150cps **£169(a)**
 Star LC200 Colour 9 pin **£159(a)**
 Star LC24-200 Colour 24 pin **£225(a)**

Inkjet

HP Deskjet 500 B/W 80 column 300dpi **£295(a)**
 Canon BJ10ex 80 column portable 360dpi **£199(a)**
 Canon BJ300 80 column 360dpi **£349(a)**
 Canon BJ330 132 column 360dpi **£390(a)**

Colour Inkjets

HP Deskjet 500C Colour 80 column 300dpi **£470(a)**
 HP Paintjet Colour 80 column 180dpi **£529(a)**
 HP Paintjet XL Colour 132 column 180dpi **£1239(a)**
 Integrex 132 80 column **£499(a)**

Laser Printers

HP LaserJet IIP PLUS with 2.5 Mb RAM **£686(a)**
 HP LaserJet IIIP 1Mb RAM **£699(a)**
 1Mb RAM Upgrade for IIIP **£56(b)**
 Canon LBP4 0.5Mb for LaserDirect HiRes **£585(a)**
 LaserDirect HiRes4 **£350(b)**

1 year on-site maintenance on laser printers

What we can offer in addition to efficient sales, service and professional backup!

We not only offer professional advice when you are purchasing your system but we will also provide friendly assistance afterwards. All our products carry a 12 month full warranty for parts and labour.

techno-ION Bundle

- ★ techno-I Real Time Colour Digitiser
- ★ Canon ION CCD Camera
- ★ SVHS Upgrade to techno-I
- ★ SVHS and RF cables

Capture 3-D objects in full colour on the Canon ION camera. With rechargeable batteries you can take up to 50 pictures, storing them on its floppy disk. They can be digitised using techno-I to provide the best images available on Archimedes computers.

techno-ION for 300/400/540/5000 £699(a)

techno-ION for A3000 £729(b)

Send for our free catalogue and price list**SPECIAL OFFERS**

A305/310

Acorn Hard Disk Controller **£79(b)**
 techno Hard Disk Controller **£79(b)**
 Brainsoftware 4 slot backplane **£25(b)**
 Cooling Fan for A310 **£13(c)**

400/1 Series

2nd Floppy Disk Drive **£75(b)**
 Replacement PSU **£75(b)**

300/400 Series

technoSCSI card **£99(b)**
 ROM Podule **£10(c)**
 AKA20 Floating Point Unit **£350(b)**
 AEDA External Floppy adapter **£10(d)**

A3000

3Mb RAM Upgrade **£119(c)**
 AEDA External floppy adapter **£10(d)**
 Technical Reference Manual **£25(c)**
 Techno SCSI card (with User Port) **£79(b)**

RAM Upgrades

A310 1Mb **£99(b)**
 A310 3Mb **£199(b)**
 A3000 1Mb **£49(c)**
 A3000 3Mb **£119(c)**
 A400/1 per Mb **£45(c)**
 A440/1 4Mb **£599(*)**
 A540 4Mb **£275(c)**
 A5000 2Mb **£110(*)**
 ARM 3 Fitted by us **£275(*)**

This is only a selection of our range, please send for our free Acorn catalogue

Name _____

Address _____

Return to:

**Technomatic Ltd, Techno House
 468 Church Lane, London NW9 8UF**

Send for
 our new
 comprehensive
 ACORN
 CATALOGUE

TECHNOMATIC

All prices ex VAT. Prices and specification are subject to change without notice. Please add carriage (a) £8.00 (Courier, 2 days) (b) £5.00 (c) £2.50 (d) £2.00. Next day delivery at extra charge.

The Complete Upgrade Solution



Qualified
Dealer

8Mb Memory

- Uses only eight RAM devices
- Suitable for A440, A400/1 & R140
- Fully RISC OS compatible
- Four layer printed circuit boards
- Courier collection & fitting included

8 Mb upgrade - £499

410/1 Memory

- 400 series RAM upgrade kits
- Supplied with full fitting instructions
- 410/1 to 420/1 requires 1Mb
- 420/1 to 440/1 requires 2Mb
- 410/1 to 440/1 requires 3Mb

1Mb - £35 2Mb - £64 3Mb - £98

A310 Memory

- Four layer printed circuit boards
- Free MEMC1a with 4Mb upgrade
- Courier collection & fitting included

2nd Mb - £99 4th Mb - £199
2nd to 4th Mb upgrade - £115

A3000 Memory

- Uses only eight RAM devices
 - User upgradable from 1 to 4 Mb
 - Four layer printed circuit board
 - Low power consumption
 - Available without RAM devices
- Bare card - £35
2nd Mb Card - £56 4th Mb Card - £145

A540 Memory Cards

- Uses only eight RAM devices
 - Four layer printed circuit board
 - Three cards may be fitted giving a total of 16Mb of memory
- A540 4Mb upgrade - £275
Two memory cards - £520
Three memory cards - £749

ARM3 Upgrades

- 3 to 4 times performance increase
 - Suitable for all ARM2 based machines
 - Does not invalidate warranty when fitted to an A3000
- 25MHz ARM 3 upgrade - £199
Collection delivery and installation on all machines - £18

A5000 Memory & Drives

- Increases A5000 memory to 4Mb
- Upgradable from 4Mb to 8Mb
- 4Mb to 8Mb price includes installation
- High quality Four layer circuit board
- No special tools required

A5000 4Mb RAM - £110 4Mb to 8Mb RAM - £399
A5000 2nd 105Mb IDE drive - £299

Aleph One 386 PC podule

- Provides full compatibility with PC software
- 10 to 20 times speed increase over emulator
- Single width podule suitable for all machines
- Multi-tasks in RISCOS window
- Upgradable with Floating Point processor

386 podule with 1Mb RAM - £495 with 4Mb RAM - £575

Syquest removable disc systems

- Including one cartridge, drive unit and all cables
- 42Mb removable cartridges
- High-flow fan fitted for improved cooling

Atomwide Syquest drive unit - £425
Drive unit with Oak SCSI card - £524
Spare 42Mb disks - £55

Quantum SCSI Hard discs

- Including drive, metalwork and all cables
 - Fast 16ms access 64K cache
 - slim line disc two drives may be fitted in one frame
 - Available as internal or external units
- 52Mb internal - £199 122Mb internal - £299
245Mb internal - £599 425Mb internal - £949
Oak 16bit card - £99 External unit add - £75

DTP & Monitors

- Impression II DTP package £130
 - Impression junior DTP package £70
 - LBP4 printer including sheet feeder £1045
 - Eizo 9060 £399 - Eizo F550i £749 - Eizo T560i £1025
 - Taxan 795 £490 - Taxan 875 £775
- All monitors come with a free VIDC enhancer
Carriage on all monitors is £7

Acorn Machines

A5000 & A5000LC - Free 4Mb upgrade
A540 - Free 4Mb ram card giving 8Mb
A3000 & A3000LC - Free 2nd Mb RAM
A5000 - £1499 A5000LC - £1531
With Eizo 9060 monitor A5000 - £1699 A5000LC £1731
A3000 - £599 A3000LC - £642 A540 - £2495



- All products are cross-compatible
- Combination deals available on all products
- Dealer enquires welcome
- Phone for full details on all products



All prices exclude VAT at 17.5% but include delivery with the exception of monitors

ATOMWIDE

23 The Greenway Orpington Kent BR5 2AY Tel 0689 838852 Fax 0689 896088



ARC vs MAC and PC

The A5000 has earned a reputation as a high quality computer. But how does it compare with the popular PC or the pricey Macintosh?

Ian Burley takes three machines and puts them to the test

ACORN ARCHIMEDES A5000

- **Memory:** 4Mb
- **Hard drive:** 40Mb
- **Price:** £1531 (Learning Curve package)

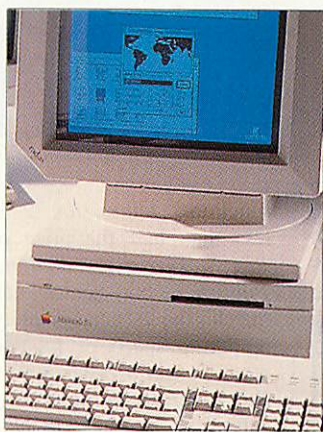
Launched last October, the A5000 is the fastest Archimedes yet and features the multitasking operating system, Risc OS 3. Speed-wise, the A5000 compares with a 25MHz 486 PC clone for most functions, although it is slower for floating point arithmetic as

it currently lacks a maths co-processor chip. But as all Archimedes enjoy colour graphics, animation and graphical user interface, operations (windows) are noticeably speedier than even the fastest PCs equipped with conventional display hardware.

The A5000 compromises outright number crunching speed and the amount of memory used for bigger screen modes. But the A5000's 13.5 mips (million instructions per second) Arm3 Risc processor

means that most display modes – including the super VGA modes like 800x600 pixels in 16 colours – remain impressively fast.

Risc OS is a very advanced second generation operating system and Wimp environment. Its intuitive operation is optimised towards a three-button mouse and many basic Risc OS functions avoid keypresses entirely, unlike PC *Windows*. Risc OS is stored entirely in Rom and takes up little hard disc or Ram space.



APPLE MACINTOSH IIx

- **Memory:** 5Mb
- **Hard drive:** 40Mb
- **Price:** £2500

This is a cut-down, budget version of the Apple Macintosh II mid-range machine. Even so, a basic Mac IIx system is almost double the price of either the A5000 or 486 PC. We could have selected the new Mac LCII in this comparison, which is closer in cost to the other two systems, but the performance

of the LCII is in the league of much cheaper 386SX or BBC A3000 systems. Even so the Mac IIx doesn't really compare with either the A5000 or the 486 PC without some pricey add-ons.

Apple pioneered GUIs with the first Macs over eight years ago. The slick Mac front end is much admired, though some might say it is beginning to show its age. The latest release of the operating system, the multi-tasking System 7, has had a mixed reception and has

been criticised for being less stable than it should be.

The Mac IIx uses Apple's 32-bit NuBus architecture and performance is generally good, although the Motorola 68030 processor is not as powerful as either the A5000's Arm3 or a PC's 486 processor. People buy Mac IIs because of their reputation for their graphics and the range of refined software but nonetheless the large price difference is immediately obvious.

486 PC (25MHz)

- **Memory:** 4Mb
- **Hard drive:** 40Mb
- **Price:** £1365

Here we take a typical budget-priced 486 PC clone. Unlike the Apple Mac market, PC prices have benefitted from intense competition. Considering the complexity of a 486 PC, its pricing defies logic. But complexity is not necessarily a good thing. All ISA or AT-level PCs are based on a design first introduced ten

years ago. This means that a 32-bit 486 PC is throttled by a 8/16-bit expansion bus and a bodged memory architecture. Many 486 PCs are supplied with Microsoft *Windows*, but users tend to find it slow as standard PC video graphics adaptors cannot operate at full speed compared to the main processor. *Windows 3* has boosted PC software sales tremendously, but it is not the most intuitive or elegant of GUIs and many users avoid it altogether. The trade off is

compatibility. Software and hardware add-ons will work on the simplest XT 8086 PC to the latest 486 machines. That compatibility has maintained the PC domination, despite the introduction of other superior computers.

A new 32-bit open PC standard, Extended ISA (EISA) has been introduced to answer many of the PC critics, but another relic, the Microsoft DOS operating system, will be continuing a key area of PC compromise for a while yet.



THE APPLICATIONS

Wordprocessing, spreadsheets, multimedia, graphics, desktop publishing, databases, communications, CAD (computer aided design), education and of course games are all represented on the A5000.

Some areas are stronger than others. I would have no hesitation in recommending an A5000 for desktop publishing, graphics, education or comms, for example. Although there are packages for database users and small business accounts and they are very good for what they offer, the A5000 is not recommended for heavy duty applications, like SQL databases and major business accounting systems, and dedicated project planning aids.

Another criticism of Archimedes' software is that one example of each category tends to dominate and squash the competition. This is sometimes true, although whether A5000 users have seriously suffered is debatable. Acorn now says over 2000 Arc programs are listed in its latest Software Directory and although many of these are educational programs, there are several hundred general programs. Typical users should find that almost everything they require is available for the Archimedes.



DESKTOP PUBLISHING

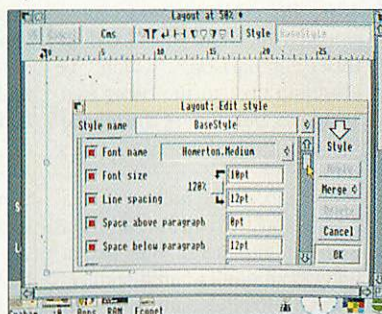
With Desktop Publishing, Computer Concepts' *Impression 2* package has emerged as a dominant force. Capable of producing material to the highest professional standards (this magazine is produced using the package) it is priced to allow Archimedes users at all levels to take advantage of its advanced wordprocessing and DTP facilities. Risc Developments is also continuing the development of its less expensive DTP alternative for the Archimedes, *Ovation*.

The Apple Mac is dominated by the *Quark XPress* DTP package and on the PC it is a toss up between *Ventura Publisher* and *Aldus Pagemaker 4*. All of these packages cost considerably more than *Impression* for the Archimedes. There are plenty of

budget-priced DTP packages for PC and Mac users, but with a few notable exceptions, there is the risk of getting what you pay for. It could be argued that *Impression* is budget priced, yet it offers both premium-priced support and functionality.

As an example, an system based on an Archimedes might be made up of an A5000, 4Mb Ram, a 120Mb drive, a hand scanner and laser printer. If you decided to plump for a Computer Concepts' LaserDirect Hires4 printer, *Impression 2* and a Watford 400dpi hand scanner, you would have to budget for around £2800 plus VAT. A similar set up for a 486 PC system based around, say, *Ventura Publisher Gold* or

Pagemaker 4, plus a low-cost PostScript printer (Star LP4PS) and a Logitech 256 hand scanner would cost about the same



The DTP system, *Impression 2* for the Archimedes offers exceptional value for money

as the Archimedes system. However the Arc's Risc OS-dedicated LaserDirect printer would be a great deal faster and operate at a higher printing resolution and the Watford scanner would have a far better range of image processing

functions. *Impression 2* is less than half the price of *PageMaker 4* or *Ventura Publisher*, but neither can match the sheer graphics rendering speed of *Impression*. To get a faster printer and better image processing software for the PC you could end up spending over a £1000 more.

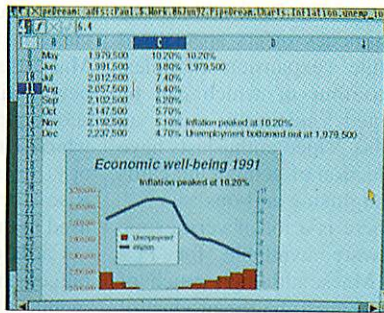
Meanwhile the Macintosh is on home territory when it comes to DTP, but the kind of money you would need to spend on a system to match the Archimedes is in another league altogether – and that is without optional accessories, such as graphics accelerators to bring graphics rendering speed up to Archimedes' levels. You would have to almost double your Archimedes or PC budget to buy a comparable Macintosh setup.

BUSINESS

For business applications ranging from spreadsheets to full-blown accounts packages, there are some good options the various platforms. For the Archimedes, there is Colton Software's *Pipedream 4* spreadsheet cum wordprocessor cum database (see the demo disc on this month's cover) as well as *Schema* from Clares. Both packages are useful, satisfying many thousands of users in everyday applications. And watch out for *Eureka* from Longman Logo-

tron to be released later this year.

If an all-singing, all-dancing spreadsheet package is required, featuring SQL, (structured query language) database accessibility and multi-dimensional modelling, then *Lotus 1-2-3* or *Microsoft Excel* on a PC or *Informix Wingz* on the Apple Mac are the favoured choices. But *Pipedream* or *Schema* on the Archimedes is more than adequate for most people's needs and at a third of



Pipedream on the Archimedes serves as a spreadsheet, wordprocessor and database

the cost. There are several Archimedes databases around such as *Squirrel* from Digital Services, and *System Delta*,

Flexifile and *Multistore* from Minerva. All cost below £200 and again they will satisfy most personal and small business user needs.

If you do need a flexible system to run a large business on, it is hard to argue against the pricier option of a *dBase* compatible system on the PC. And there are many, such as Ashton Tate's *dBase IV*, Fox Software's *FoxPro* and Borland's *Paradox*. On the Mac, there is *FileMaker Pro* from Claris, *My Advanced Database* (MacWarehouse) and the powerful *Omnis 5* from Blyth.

GRAPHICS

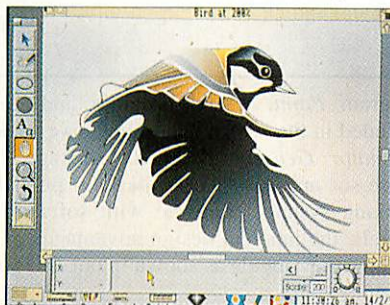
One category where the options abound is graphics. Very capable painting, drawing and presentation programs are available for the Archimedes. Just a few of these include Ace Computing's *Euclid* (3D drawing and animation); Longman Logotron's *Revelation 2* image processing package; *Atelier*, the painting and animation package from Minerva and of course *Art-Works*, the new object-oriented drawing package from Computer Concepts. Also all Archimedes have serious paint, object drawing and text editing facilities provided free as part of Risc OS.

The Archimedes is currently limited to 256 colours from a palette of 4096. PCs and Macs are easily upgraded (at a cost) to 24-bit display configurations offering up to 16.7 million colours. But that does not exclude 24-bit images from the Archimedes as Acorn has developed a special utility, called *ChangeFSI*, which translates high-res colour images into formats compatible with the standard display. Extensive use of pixel colour dithering enables colour images of startling quality to be displayed on ordinary TV.

Once again the Mac is on home territory with graphics. Packages like *ColorStudio* and *Photoshop* are unrivalled for photographic level image

manipulation and processing in full colour – at almost £1000 each! There is also the more affordable *MacDraw*, *Aldus SuperPaint* and *Aldus Digital Darkroom*. The Mac is hard to beat, but only if money is no object.

There is plenty of choice on the PC, but there are also display limitations imposed by the hardware. *Corel Draw* is almost a legend these days but has competition from the new *MicroGrafx Draw* and *Aldus Freehand* to name a few. The *Ventura Publisher* system



Artworks, a drawing package for the Archimedes, gives excellent vector graphics

now offers a *PhotoShop* level image processing package.

Multimedia has become a big issue recently and Apple have just released a new multimedia video windows system, *QuickTime*. At the same time, Acorn released *Replay*, a windowed video replay system which is said to outperform *QuickTime* in several ways (see our comparison next month). The multimedia PC standard (MPC) is based around an extended derision of the *Windows* GUI but it still suffers from the PC hardware and graphics compromise.

PRINTING

Today we place great demands on the printing abilities of a personal computer system. Speed and flexibility are of the essence. It is certainly not just a case of choosing the right printer. Factors like operating systems, font management and printer standards all need scrutiny. How do the protagonists shape up?

Printing is the Archimedes' trump card – it has arguably the best font management system and fastest printing solutions of any comparable system below £5000. The very sophisticated text font manager of Risc OS can produce a virtually infinite range of displayed or printed text sizes using scalable outline fonts. Neither Macs nor PCs get this as standard and even with comparable options, neither offer the further Risc OS feature of anti-aliased fonts which retain on-screen readability and smoothness of displayed text to tiny sizes.

Coupled to that is the fact that the same font manager handles displayed and printed fonts so what you see on screen will be the closest possible representation of what gets printed. Hardware developments also mean the A5000 can offer the fastest laser printing around – and at up to 600 dpi (dots per inch) resolution.

So how do the PC and Mac compare? Well, the sheer ubiquity of the 486 PC means that it can be connected to all

manner of printer hardware. But lack of standardisation can be a problem. As the Dos operating system manages printer output, applications which offer printing must reinvent the wheel and provide their own printer support. Some applications are very good, some less so.

Then there is a whole army of competing font systems, including Adobe Type, Bitstream, Typografica and Manager. The cheaper ones only offer pre-set font sizes, and printer font matching can be a problem. A properly set up PC is capable of printed results as good as any other, but getting your PC set up properly in the first place is not always a simple task.

With the Mac, on the other hand, there are less printer standards to juggle, as Apple has dictated the trends. At the budget end, Apple offers conventional dot matrix and ink or bubble-jet printer support. Apple actually badge-engineers Canon's excellent bubble-jet printers. At the higher end, Apple standardises on PostScript.

PostScript printers are more expensive than less complex HP LaserJet compatibles, but prices have dropped recently and respectable PostScript laser printers can now cost less than a grand. PostScript is fast for printing fonts, but can be slowed up by bit-image graphics and this an area where the advantage held by the Archimedes LaserDirect is clearly maintained.

EXPANSION

There is no shortage of hardware upgrades for any of the systems we are comparing here. All offer upgrades like Midi interfaces, laboratory equipment control interfaces, Ethernet networking interfaces, SCSI (small computer system interface standard) for extra hard discs, image scan-

ners and CD Rom drives. The Archimedes offers specialised 'module' expansion modules, up to four of which can be plugged internally in an A5000. Video enthusiasts have a selection of genlocking cards and digitising add-ons.

There is a lot of very exotic hardware available for PCs and Macs, although much of this seems to be the product of

a struggle to counter deficiencies in the basic machines. Mac users are faced by a bewildering array of graphics accelerator cards, a couple of which (from Radius Technology) even use the same Arm Risc processor technology used in the Arc.

Cards to accommodate ever bigger and higher resolution monitors are common for PCs

and Macs and a number of these are under development for the Arc.

Considering its relatively small user-base, the Arc has an impressive selection of hardware add-ons, several of them highly innovative. This is probably thanks to the appeal of the Arc to skilled enthusiasts who are experts in electronics engineering.

WHAT YOU GET

	A5000 (Learning Curve)	486PC (Model 5/40)	MACINTOSH IIsx
Processor	25MHz ARM3	25MHz 486	20MHz 68030
Memory	4Mb	4Mb	5Mb
Hard drive	40Mb	40Mb	40Mb
Floppy drive	1.6Mb	1.44Mb	1.44Mb
Operating system	M/tasking Risc OS 3	S/tasking Dos 5	M/tasking System 7
Screen	14in multisync 800x600 16 colours 640x512 256 colours 1152x896 monochrome	512K SVGA 1024x768 16 colours 800x600 256 colours	13in hi-res 640x480 256 colours
Sound	8 stereo voices	Single channel beep	Sampled beep
Bundled software	PC Emulator, Genesis 1st Word+ WP, Multimedia, Maestro Draw, Paint, Edit BBC Basic V + More	Paint, GW Basic	Various utilities
Price	£1531	£136	£2500

The prices quoted are competitive deals and well below suggested retail pricing. (The PC price was quoted by Watford Electronics.) It's no surprise that a PC works out slightly cheaper than an equivalent Arc, on the other hand the Mac is a lot dearer – even though its relative performance is less than the Arc or the PC. Bear in mind that for this price, the Arc has three applications built in: *Draw*, an object oriented drawing

program; *Paint*, a paint program; and *Edit*, a text editor. Also included in the Acorn Learning Curve package is the *Acorn PC Emulator*, *Genesis* multimedia package, *1st Word Plus* word-processor and *Acorn DTP* desktop publishing software. For a working system, complete with software and hardware peripherals, the inherent design advantages of the Arc really begin to show their mettle as shown in our DTP section on page 28.



CONCLUSION

Let's make it perfectly clear – all of the systems we have looked at here offer serious and desirable solutions to specific tasks and warrant consideration for the right purpose and situation. If your budget is unlimited, it may be difficult to resist the Apple Macintosh – you may pay twice the price of the equivalent PC or Archimedes solution, but with the right investment the Mac can do most things extremely well.

But if you cannot justify the cash, the Macintosh is seriously flawed. Do you settle for a lesser Mac model and end up

with a relatively easy to use, but slow, computer which might be expensive to maintain and expand?

The PC option is more clear cut – a safe but unambitious bet. PCs dominate the market and are therefore cheaper, more easily expandable and there is plenty of software. But there are questions over the Windows/Dos compromise – software can be expensive, buying a cut-price PC clone needs to be done carefully and ease of use is not a PC advantage.

And so to the A5000. The software selection is often far less expensive, although not

as wide as that for a Macintosh or PC. However, the A5000 can run PC software using the *PC Emulator* and packages are available to utilise Macintosh files.

If you step back from any prejudices and view the A5000 platform on its merits, you will find it difficult to match the superior graphics performance, the no-compromise and easy to use operating system and desktop graphics environment, the fastest and highest resolution printing solutions around and several outstanding software applications which marry all these exclusive features together.

THE DRIVING FORCE



Winner of the Best Printer in the recent Computer Shopper Awards, the Cannon BJ10ex printer has revolutionised the small printer market. It offers 360 dpi, near laser printer quality, on plain A4 paper, in an incredibly compact and lightweight housing. Unfortunately the existing RISC OS printer drivers, based on the standard Acorn drivers, have definitely been in the slow lane, locking your computer up for the entire print process, often up to ten minutes per page.

Computer Concepts have now created a set of RISC OS printer drivers, called TurboDrivers, that are optimised for the Cannon BJ10ex printer. The result is the perfect combination of budget printer and RISC OS printer driver, able to print full 360 dpi high resolution pages at a quality superior to that available from any dot matrix printer.

The TurboDrivers not only print the pages faster, but give control back sooner - up to ten times quicker. The table shows the time taken to print and the time the computer is occupied for some typical example pages.



Shows optional sheet feeder attached to printer

Standard Driver

Time to complete

521 seconds

753 seconds

643 seconds

TurboDriver

Time to complete

199 seconds

283 seconds

261 seconds

Time to get control back

70 seconds

64 seconds

187 seconds

A complex page of text & graphics

2 pages text in different fonts

One complex page from !Draw

All times in seconds from a standard ARM2 Archimedes with 4MBytes RAM and hard disc. Times would be faster for an ARM3 based machine.

BJ10ex printer & drivers £249.00 + VAT (£292.57) + p&p. Optional 30 sheet feeder £48.00 + VAT (£56.40)
TurboDriver software & printer cable £49.00 + VAT (£57.57)

Compatible with all applications that use the RISC OS printer drivers and all Archimedes models.

The TurboDrivers print faster on an ARM2 machine than traditional drivers on an ARM3 machine. In addition they can send the print data to disc and then print from disc in the background, so the computer and almost all memory remains free for other uses, while the printer gets on with printing.

RISC OS
Turbo
D R I V E R S



Computer Concepts Ltd

Memory upgrades

A5000
£1499

Acorn's new machine with RISC OS 3, multisync monitor, ARM3, and 40Mb drive. An extra 2Mb of RAM (4Mb total) is included free.

A5000 learning Curve - £1531. (£1798.92 inc. VAT)

A5000
RAM
£99

Upgrades your 2Mb A5000 to 4Mb. High quality 4-layer board as recommended by Acorn. Fitting does not involve any soldering. Extra 2Mb (4Mb total) £99.

N.B. This upgrade is currently supplied free of charge with both of the A5000 systems above (ie standard version and the Learning Curve).

A3000
RAM

- Only 8 RAM chips - low power consumption
- User fittable - no soldering required
- Available as a "bare board" (ie sockets, but no RAM)
- Gold-plated connectors ensure long term reliability
- 4Mb - £130 2Mb - £55 Bare board - £25.50

A310
RAM

8-chip design ensures low power consumption. Compatible with ARM3 upgrades, backplanes, hard discs etc. Larger OS ROM option. Four-layer circuitry reduces electrical noise for trouble-free operation. The 2Mb board may be upgraded to 4Mb later.

2Mb - £99

4Mb - £163

In addition to a two year warranty, all the upgrades described here are covered by our no-quibble 14-day money-back guarantee. Your statutory rights are not affected.

All prices exclude VAT.



Further information and price list from;



IFEL, 36 Upland Drive, Derriford, Plymouth PL6 6BD.
Tel (0752) 847286. Fax 840029



BANK MANAGER

Complete and versatile personal accounts program. Consistently acclaimed! 'data entry is a delight...professional...excellent product' Micro User April 86
Standard version: Enter cheques and receipts. Automatic date sequencing. Reconcile statements. Search, amend and delete. Analyze expenditure. Forward cash flow forecast. Budgets. Up to 36 bank accounts online, inter account transfers, 9999 standing orders, 99 analysis headings, over 4,000 postings on an 80tk diskette. Reports to screen or printer. Mix foreign currencies, graphics, password, file recovery, field editing, programmable reports.
Master/Compact version adds ADFS/hard disk support, sideways RAM, 40/80 col screen reports, and other enhancements.
Archimedes/A3000 adds high speed native mode, RAM disks, wild card analysis enquiries, sort and more. 'Impressed...ideal...easy to use' Micro User March 88
Bank Manager (all versions; disk systems only) £25.00

BANK MANAGER BUSINESS UTILITY

For the club accounts or small business user. From the Bank Manager data files print "trial balance" or "P&L reports" via the programmable spreadsheet generator.
Business Utility Pack (needs the Bank Manager) £12.00

TYPING TUTOR

Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Word scan or exact key checking, targets may be revised, rhythm metronome, key click, free format options. Recommended for adult education. Typing Tutor £15.00

SPREADSHEET MK V

Low cost, versatile spreadsheet. 26 cols, 900 (Arch/A3000) or 99 (B/Master) rows, many functions and facilities inc programmable report writer and input scripts.

Spreadsheet MK V disk £15.00

All programs available in B, Master/Compact and Archimedes/A3000 versions. Archimedes/A3000 versions are RISC OS compatible

State type of computer (eg A3000, B, Master) and disk type (eg 3 1/2" or 5 1/4" 40 track or 5 1/4" 80 track). Please add £1 P&P (Overseas £3.50)

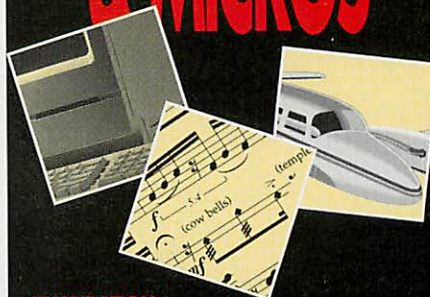
CONTEX COMPUTING

(Ref AU), 15 Woodlands Close,
Cople, Bedford MK44 3UE



Tel: 0234 838347

MUSIC, GAMES & MICROS



INSPIRATION

The most comprehensive music sequencing package available for the Archimedes.

Come and visit our demonstration area, or send a blank disc for a demo version. Fully Risc OS compatible. Purchase with Archimedes (special price), or simply add it to your existing system. All you need is a MIDI keyboard!

INSPIRATION

Offers a control panel featuring: Replace and Overdub record modes • Cue Start and End • System Status display • Multiple save capabilities and many, many other features.

Prices exclude V.A.T.



153A VICTORIA STREET • ST ALBANS • HERTS AL1 3TA
TEL: 0727 50075 • FAX: 0727 58977

MUSIC SOFTWARE

INSPIRATION: FULL 250 TRACK 99
REEL MIDI SEQUENCER£195
CLARES RHAPSODY II£50
CLARES RHAPSODY II UPGRADE£12
CLARES ARMADEUS SAMPLER &
SOFTWARE£68
ARMADEUS SOFT & H/WARE£170
NOTATE£55
TRACKER (VERTICAL TWIST)£42
MIDI TRACKER (VERTICAL TWIST)£16
ACORN MIDI PODULE A3000£45
ACORN MIDI PODULE A400£65

MUSIC PACKAGES

INSPIRATION + RHAPSODY + ACORN
MIDI PODULE (A3000)£260
A3000LC COLOUR SYSTEM +
INSPIRATION + RHAPSODY + ACORN
MIDI PODULE (A3000)£1000

ARCHIMEDES SYSTEMS

A3000 ENTRY SYSTEM£580
A3000 COLOUR SYSTEM£780
A3000LC MKII ENTRY SYSTEM£640
A3000LC MKII COLOUR SYST£850
A5000 SINGLE FLOPPY DISC£990
A5000 40MB HARD DISC INCLUDING
MULTI-SCAN MONITOR£1450
A5000LC 40MB HARD DISC INC.
MULTI-SCAN MON£1530
A540 ENTRY SYSTEM£2400
A540 COLOUR SYSTEM£2650
A540 WITH MULTISYNC£2900
EIZO 9060S MULTISCAN MON£399
EIZO 9070S MULTISCAN MON£599

UPGRADES

A3000 2ND MB£50
A3000 2ND TO 4TH MB£155
ARM 3 FOR A400/1£195
SYQUEST REMOVABLE 42MB£400

GAMES

ALIEN INVASION, APOCALYPSE,
ARTICULATE, BLOWPIPE, BOODIE BUGGY,
BREAK 147, CHESSE 3D, CHOCKS AWAY,
CHUCK ROCK, ELITE, E-TYPE, HOLED OUT,
INERTIA, INTERDICTION II, NEVRON, SALOON
CARS, THE WIMP GAME, ETC. ETC.

ACORN APPROVED LONDON DEALER

Wide range of software and
hardware stocked

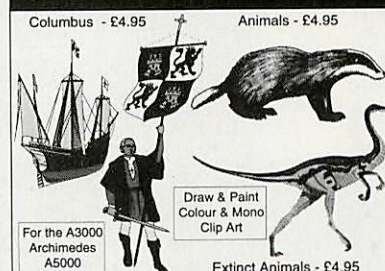
EDUCATION ORDERS WELCOME
PHONE FOR BEST PRICES

Easy to get to
Train: WOOD ST Station
(British Rail)
Road: Bottom of M11,
just off North Circular
Tel No: 081-521 1784



AUTOMATIC SERVICES
217 WOOD STREET
WALTHAMSTOW
LONDON E17 3NT

Select Your Own Clipart and Data Resources



Order directly from DEC_data
The Auto-Catalogue/Sample
disc costs £1 (free with order)
Please quote Ref AU1

DEC_data
60 Danes Road, Exeter EX4 4LS

for dATA_FILES
and Clip Art
0392 221702

Weather Data

Weather Satellite Systems Now available for the Acorn Archimedes A310 and A3000. This Meteorat systems comes complete including everything from the Antenna to the software. Animation is standard allowing the dynamic progress of weather fronts to be monitored and tracked. High resolution images of 800 pixels by 800 lines can be stored and manipulated in colour or grey scales on any standard colour monitor. Acorn Change FSI registered and compatible. Capable of receiving up to 400 images every day this remarkable system costs just £799.00

Other Timestep products include a fully featured **LANDSAT** Image Processor with 20 field study images and three full colour manuals. Acorn Change FSI registered and compatible at only £99.95

PC Globe and **PC USA** are full colour graphical databases of the world with an amazing amount of retrievable data. The special Timestep education price is only £59.95

Send for our full catalogue.

Timestep Weather Systems

Wickhambrook Newmarket, CB8 8QA England.

Tel: 0440 820040 Fax: 0440 820281

PRINTER REPAIRS

specialists in laser printers

EPSON, STAR, SEIKOSHA,

HP, BROTHER, CANNON

Sales/Service/Support/Spares

For Government and Educational organisations we can repair printers at a fixed rate. Please ring for further details

B.V. Computer Maintenance Ltd

Park Royal Business Centre,

9-17 Park Royal Road, London NW10 7LQ

Tel: 081-965 4056

Fax: 081-961 7313

LOWEST ADVERTISED PRICES



A5000 Learning Curve
Multisync System
ONLY £1299

optional

Ink-Jet Printer £199

Also available without Learning Curve



UNIX

We have a few R140 machines to clear out at **ONLY £999** plus Acorn's On-Site Support for 1 year at £175. Monitor extra.

Mail Order Only

Education orders welcome.
VAT extra on all prices.
Access and Visa welcome.
Carriage £8
Next day supplement £5

MICRO DISCOUNT phone 041 353 1999
205 Buchanan Street, Glasgow, G1 2JZ.

Micro Studio

Graphics Library Packs for the Archimedes, A5000, A3000

Title	Format	Price
DTP Graphics Mono & Colour	(Draw or Paint)	£29.95
Business Pack <i>(ready soon)</i>	(Draw & Paint)	£29.95
Cartoon Collection	(Draw & Paint)	£29.95
Childrens Pack	(Draw & Paint)	£29.95
Decorated Alphabet	(Paint)	£29.95
Designers Pack	(Draw & Paint)	£29.95
Draw Mazes	(Draw & Paint)	£29.95
Greetings Pack	(Draw & Paint)	£29.95
History: Costume	(Draw & Paint)	£19.95
Illustrators Pack	(Draw & Paint)	£19.95
Military History	(Draw & Paint)	£19.95
Nature Pack	(Draw & Paint)	£19.95
Prehistoric Animals	(Draw & Paint)	£19.95
Science Pack	(Draw & Paint)	£19.95
Seashore	(Draw & Paint)	£19.95
Space	(Draw & Paint)	£29.95
City Maps	(Draw & Paint)	£29.95
Life Pack	(Draw & Paint)	£29.95

GRAPHICS

**For complete free catalogue
Send stamped addressed envelope**

**MICRO STUDIO 22 Churchgate Street
SOHAM, Cambridgeshire. CB7 5DS
Telephone 0353 720433**

We Don't Sell Computers We Sell Solutions!

We have changed our name but not our service. Broad Oak Computers have been giving a superb service to Acorn Users for over a year. But we don't just sell computers, we offer a complete service to the computer user and buyer which includes **FREE** local delivery and training, and full after sales support with a good choice of software always available.

Our superb training facilities offer courses for all levels of experience including complete beginners. Our new correspondence courses are perfect for those with a busy lifestyle. Courses are also available for IBM PC compatible users.

Whatever your computing needs, phone us on **0279 718767**, or fax **0279 718596**

Broad Oak Computers

High Street
Hatfield Broad Oak
Bishops Stortford
Herts CM22 7HE
Phone 0279 718767
Fax 0279 718596

Watford Electronics

(A member of the Jessa group of Companies – Established 1972)



Jessa House, 250 Lower High Street, Watford WD1 2AN, England

Tel: Watford (0923) 237774 Tlx: 8956095 Fax: (0923) 233642



**The sign of
Quality**

Shop Hours: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.

All prices exclusive of VAT; subject to change without notice & available on request.

**The choice
of Experience**

Archimedes micro

System	Basic	Mono	Colour	Multiscan
A540/1	£2495	£2555	£2655	£2815
A3000	£599	£665	£759	£924
A3000L/C	£642	£708	£802	£967
A5000H/D	–	–	–	£1499
A5000L/C	–	–	–	£1531

Unbeatable Sale Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A410/1	ARM 3 Turbo Card upgrade fitted
A540/1	Multiscan monitor with VIDC enhancer and LC20 Printer
A3000	2Mb RAM; Monitor plinth and Acorn's A3000 Shoulder Bag (carrying case)

Plus of course our no quibble 12 months FREE On-Site Maintenance on all above Micros.

Archi Accessories

• 3.5" 800K 2nd Floppy Drive (305/310)	£118
• 5.25" 800K external Floppy Drive	£85
• I/O Podule (Analogue/User/1MHz bus)	£79
• I/O Podule (Analogue/User)	£49
• MEMC 1A Upgrade	£29
• MIDI add-on to I/O Podule	£27
• MIDI Expansion Card	£65
• Econet Network Board	£42
• Archimedes IEEE Interface Adaptor	£269
• Dual RS232 Podule	£195
• 16 bit parallel I/O Card	£195
• Archi replacement mouse – New design	£32
• PC Emulator v1.7	£85
• Software Developers Toolbox	£149
• Floating Point Unit	£455
• SCSI Adaptor Expansion Card	£156
• Keyboard Extension Lead	£6
• 2 Podule Backplane	£20
• 4 Podule Backplane	£25
• Fan for above backplanes	£8
• Risc Os Extras Software Disc	£5
• Ethernet Card	£220
• SCSI Card 8 bit	£129
• A5000 – 2 to 4Mb RAM Upgrade	£122

A3000 Accessories

• 3.5" External Drive	£95	• Monitor Stand	£13
• Technical Manual	£39	• Serial Upgrade	£17
• A3000 Dust Cover	£5		
• A3000 plus Monitor Dust Cover	£9		
• A3000 User Port/Midi Upgrade Card	£44		
• A3000 User/Analogue/IIC I/O Card	£42		
• A3000 External Podule Case	£13		

Staff Vacancy

Watford Electronics are inviting Hardware and Software engineers to apply for positions in their new R & D team. Hardware engineers must be familiar with the Archimedes architecture and able to follow a project from conception to production. Software engineers should be proficient in ARM assembler or Acorn C, and able to write RISC OS applications and module code.

Applicants should be well motivated and show experience in relevant areas. Qualifications are not as essential as your ability to produce innovative solutions to challenging problems. As a new member of the team you will be in a unique position to develop your career in a rewarding environment.

In the first instance forward your CV to Shiraz Jessa or Chris Honey

Archimedes A3000 Desk Top Publishing (DTP) Sale Offer

A3000 BBC Archimedes Micro with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, COLOUR Monitor + Lead, 20Mb fast IDE Hard Disc Drive, 'Compression' Utility to increase the Hard Drive capacity to Typically 40Mb, The highly acclaimed Computer Concept's Impression Junior DTP software package.

RRP: £1299

Sale Offer Price: £849

Above Package plus Acorn's Learning Curve £892

**Special Education discounts
available on above package, micros,
RAM upgrades, ARM 3 Turbo Card,
etc. Please write in or telephone:
(0923) 237774/250335**

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

• R302-A3000 – to 2MB RAM Upgrade	£36
• R303-A3000 – to 2MB RAM Upgrade	
(expandable to 4MB)	£55
• R304-A3000 – to 4MB RAM Upgrade	£119
• R311-A305 – to 1MB RAM Upgrade	£30
• R312-A305/310 – to 2MB RAM Upgrade	£149
• R314-A305/310 – to 4MB RAM Upgrade	£205
• R412-A410/1 – to 2MB RAM Upgrade	£30
• R413-A420/1 – to 4MB RAM Upgrade	£60
• R414-A410/1 – to 4MB RAM Upgrade	£90
• R810-A410/1 – to 8MB RAM Upgrade	£599
• R820-A420/1 – to 8MB RAM Upgrade	£569
• R840-A440/1 – to 8MB RAM Upgrade	£499
• R814-R140 – to 8MB RAM Upgrade	£499
• A5000 – to 2MB additional RAM Upgrade	£109

0% Finance & Special

Teachers/Academics' prices

Now available on A3000L/C

and A5000 L/C Micro Systems

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10 – to 2MB RAM + 20MB Hard Disc	£159
UP15 – to 2MB RAM + 40MB Hard Disc	£245
UP20 – to 4MB RAM + 20MB Hard Disc	£225
UP30 – to 4MB RAM + 40MB Hard Disc	£309
UP40 – to 4MB RAM + 53MB Hard Disc	£429

Graphics, Art, Design & Games

GRAPHICS			
ARCTist	£19	Pipe Mania	£17
ARCTiculate	£19	Pirate	£16
Atelier	£65	Power Band	£14
Artisan II	£45	Puncman 1 & 2	£16
Artisan Gallery	£16	Puncman 3 & 4	£16
Autosketch II	£65	Pysanki	£14
Craftshop 1 & 2	£28	Quazer	£10
Euclid 2	£50	Real McCoy	£22
Graph Box	£59	Real McCoy 2	£23
Graphbox Professional	£107	Redshift	£14
HotLink Presenter	£40	Return to Doom	£16
Kermit	£46	Repton 3	£14
Mogul	£17	Saloon Cars	£18
Poster	£79	Spitfire Fury	£22
Pro Artisan	£70	Splice	£25
Prime Art	£69	Sporting Triangles	£24
Render Bender 2	£95	Star Trader	£14
Revelation 2	£80	Superior Golf	£14
Snippet	£21	Super Pool	£19
Tween	£21	Swin	£22
		Talisman	£12
		The Pawn	£19
		Timewatch	£24
GAMES			
Air Supremacy	£14	Trivial Pursuit	£22
Apocalypse	£14	Twin World	£15
Arcade Soccer	£14	U.I.M.	£23
Avante Garde Fonts	£23	White Magic 2	£15
Boogie Buggy	£14	Wimp Game	£13
Break 147	£18	Worldscape	£16
Bug Hunter	£13	XFire	£19
Caverns	£13		
Chess 3D	£14		
Chocks Away 2	£14		
Chocks Away Extra	£14		
Chopper Force	£22		
Conqueror	£15		
Cops	£14		
Corruption	£18		
Crisis	£21		
Elite	£33		
Enter the Realms	£19		
Enthar Seven	£21		
E-Type	£14		
E-Type Designer	£13		
Family Favourites	£13		
Fireball 2	£19		
Grievous Bodily Arm	£19		
Holed Out Designer	£13		
Holed Out Golf	£13		
Hostages	£14		
Ibix the Viking	£13		
Inter Dictor 2	£26		
Iron Lord	£15		
Jiglet	£25		
Jigsaw	£27		
Lemmings	£20		
Masterbreak	£16		
Man at Arms	£14		
MahJong Patience	£15		
Manchester United			
Europe	£19		
Mig 29	£32		
Nevryon	£14		
Olympics	£14		
Pandoras Box	£18		

Miscellaneous

Ancestry	£59
Arcomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Compression (CC)	£38
Equasor	£38
FlexiFile	£97
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
JX Archi Colour Printer	
Driver for Citizen &	
Star Printers	£15
Maggie 2	£46
Notate	£42
Numerator	£66
Pin Point	£65
Presenter 2	£29
Presenter Story	£145
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Show Page	£127
Speech!	£15
SWIV	£19
The Victorian	£17
Time Tabler	£549
Toolkit (Claires)	£35
Touchtype	£40
Tracker	£39
WorldScape	£17



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383**

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided. P.S. A310 upgrades require a backplane and a fan.

• 3HDP – Hard Disc Podule only	£135
• 3HD20 – 20Meg H' Disc + Podule for 310	£235
• 3HD40 – 40Meg H' Disc + Podule for 310	£345
• 3HD50 – 53Meg H' Disc + Podule for 310	£474
• 4HD20 – 20Meg Hard Disc for 410	£129
• 4HD40 – 40Meg Hard Disc for 410	£215
• 4HD50 – 53Meg Hard Disc for 410	£335
• A3000 20Meg Hard Disc + Podule	£299
• A3000 40Meg Hard Disc + Podule	£429

For Low Cost, High Performance Archimedes IDE Hard Disc Drives, please turn to page 13

Desk Top Publisher

Acorn's Archi DTP Package	£108
Equasor	£39
Impression 2 DTP Pack	£125
Impression Junior	£69
Impression Business Supplement	£39
Impression II Borders Disc	£19
Expression-PS	£19
Tempest DTP Package	£90

Archi Wordprocessors

Pendown Archi	£48	1st Word Plus – 2	£63
Pendown Outline		Archie Spell Master	£25
Fonts	£18	PD Spellchecker	£40
Wordwise + Disc	£24	Graphic Writer	£19
Image Writer	£25	EasiWord	£18
Interword Disc	£24		

Databases

AlphaBase	£36	Magpie	£40
Flexifile	£79	Multistore v2.01	£176
Knowledge Organiser	£42	Pinpoint	£65

Spreadsheets

Intersheet Disc	£24	Schema	£89
Viewsheets	£45		

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79 • Pipedream 4 £149
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £75

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analogue to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analogue to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes.

£15

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Professional			£275
Realtime Solids Modeller			£136

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. New RISC OS Version

Only £15

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Up to 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

- A300/A3000 £21 • A400 £25

More Archimedes Products See Pages 3, 5, 6, 8, 10, 13

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77	£77 each
Assembler; LISP; Prolog X	£149 each
ANSI C Rel. 3	£125
Logotron Logo	£45
Macro Assembler	£40
Risc Basic	£120
Robo Logo	£69
Risc FORTH	£110
BASIC Compiler	£77

NEW

256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.

256 Grey-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3mS per line! (Twice as fast as most scanners.)
- Selectable 256/16 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- Over 1000 Image processing options; smoothing, enhancement, edge deletion, convolution, etc.
- Full Interface to ChangeFSI

Special Launch Price

£185

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

Price: £149

Minerva's Archimedes Software

EasyWord	£18	Mailshot*	£27
Home Accounts	£35	Reporter*	£27
Time Tabler	£549	School Admin*	£65
System Delta	£59		

System Delta Program Reference Manual £29

* Requires System Delta to operate

Stand alone Business Accounts Packages

Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management

£79 per module

or Complete Business Package £325

ARM 3 Turbo Card

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Offer Price £169

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

Continued → → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheets, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) £399

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during May

Add-Ons & Accessories

Econet Module for the Master	£42
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I (No VAT)	£14
Master Reference Manual II (No VAT)	£14
Master Advance Ref Manual (No VAT)	£17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Ecolink	£270

Z88 Portable Micro



£179

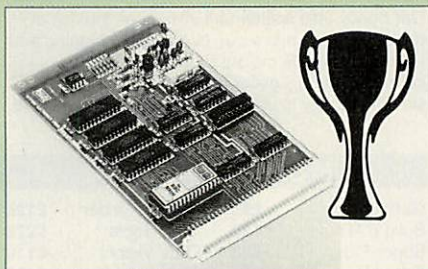
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack	£16
• 128K RAM Pack or 128K EPROM Pack	£32
• 512K RAM Pack	£86
• 256K EPROM Pack	£55
• Z88 EPROM Eraser Unit	£38
• Z88 Carrying Case	£8
• Z88 Computing Book	£9.95
• AA Nicad Rechargeable Battery	£1.50
• Battery Charger Compact & Fast	£6
• Z88 Serial Printer Cable	£8
• Z88 Parallel Printer Cable	£18
• Z88 to Archi Link	£15
• Z88 to BBC Link	£8
• Z88 to PC Link II	£27
• Z88 to Macintosh	£32
• Z88 Mains Adaptor	£9
• Z BASE	£56
• Z TAPE	£42
• Z TERM	£42
• Z88 Modem	£114

Archi Real-Time Digitiser



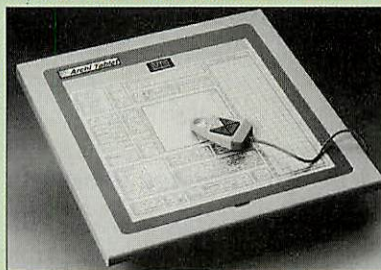
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £119

A Set of Colour Filters for colour image grabbing using a video camera **£16**

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).
(FREE this month, PC Mouse Drivers & Art package)

Special Price £165

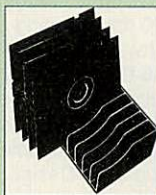
(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £110

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2



Special Bulk Offer Discs

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S	D/S	D/S
	40T	40T	80T
• Without Sleeves 5.25"	£28	£33	£38
• With Sleeves 5.25"	£31	£36	£41
• 3.5" D/S D/D	£27 for 50	£49 for 100	

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	£16.00
• Watford DFS Kit complete	£69.00
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	£12.00
• DFS Manual (comprehensive)	£6.95
• Acorn DNFS ROM	£17.00
• Acorn ADFS ROM only	£25.00
• Acorn 1772 DFS ROM Kit	£49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have replaced it with their more up-to-date 1772 DDFS Interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus the added features as follows:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
 - Auto 40-80 Track sensing – no need to fuss with 40/80 track switches.
 - An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
 - New low profile – small footprint board.
 - Option to double the speed of file handling operations – BPUT and BGST.
 - Operates in both single and double density modes.
- SPECIAL PRICE £44.00**
DDFS Manual (No VAT) £6.95
 We will exchange your existing DFS Kit for our sophisticated DDFS for only **£30.00**

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor

• 10 x 5.25" S/S D/D 40T (744)	£5
• 10 x 5.25" D/S D/D 40T (745)	£5
• 10 x 5.25" S/S D/D 80 Track (746)	£7
• 10 x 5.25" D/S D/D 80 Track (747)	£7
• 10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT	£9
• 10 x 3.5" S/S D/D 40/80 Track	£7
• 10 x 3.5" D/S D/D 40/80 Track	£7
• 10 x 3.5" Double Sided High Density	£13

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

• 10 x M3 3.5" D/S D/D 80 Track	£7
• 10 x M9 3.5" D/S High Density	£12
• 10 x M4 5.25" S/S D/D 40 Track	£5
• 10 x M5 5.25" D/S D/D 40 Track	£5
• 10 x M7 5.25" D/S D/D 80 Track	£7
• 10 x M8 5.25" D/S H/D Hi-Density	£9
• M2 3" Double Sided	£2.50 each

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.

Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

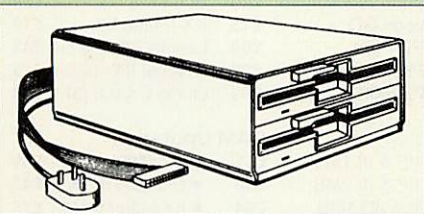
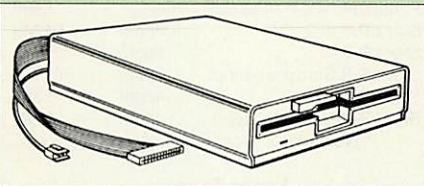
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.**

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



Our Disc Drives conform to BS415

Type	Description
Disc Drive without PSU	
• CLS400S:	Single, 40/80 track 400K Double sided Drive £70
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives £138
Disc Drive with PSU	
• CS400S:	Single, 40/80 track, 400K Double sided Drive £80
• CD800S:	Twin, 40/80 track, 800K Double sided Drives £153

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

3.5" Disc Drive



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
Disc Drive without PSU		
• CLS35:	Single Disc Drive, 400K	£59
• CLD35:	Twin Disc Drives, 800K	£109
Disc Drive with PSU		
• CS35:	Single Disc Drive, 400K	£82
• CD35:	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



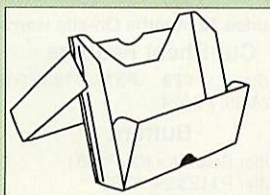
• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£154

Plastic Library Cases



DLC1 – Holds 5 x 3.5" Discs.	£1.50
DLC2 – Holds 10 x 3.5" Discs.	£1.90
DLC3 – Holds 5 x 5.25" Discs.	£1.60
DLC4 – Holds 10 x 5.25" Discs.	£2.00

Disc Albums

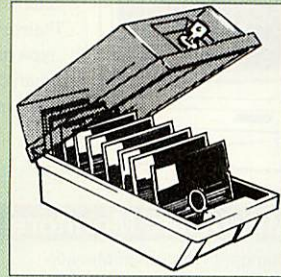
Attractively finished in leather-look PVC Vinyl	
DW1 – Holds 6 x 3.5" Discs	£2.50
DW2 – Holds 6 x 5.25" Discs	£3.00
DW3 – Holds 20 x 5.25" Discs	£3.50
DW4 – Holds 40 x 3.5" Discs or 5.25" Discs	£4.50

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units



Gives double protection – Strong plastic case that affords real protection to your discs.

Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

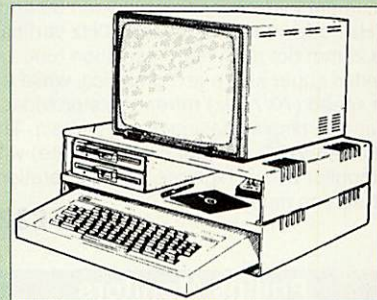
• M35 – holds up to 50 5.25" discs	£4.95
• M85 – holds up to 95 5.25" discs	£6.95
• M25* – holds up to 25 3.5" discs	£4.95
• M50 – holds 50 3.5" discs	£6.50
• M100 – holds 100 3.5" discs	£6.99
• M10 – holds 8 of No. 10 Data Cartridges	£15

* Not lockable

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Plinths for the BBC B, BBC Master & A3000



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

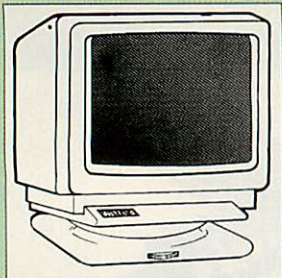
Single BBC Plinth	420 x 310 x 105mm	£13
Double BBC Plinth	420 x 310 x 210mm	£24
Single Master Plinth	490 x 310 x 105mm	£14
Double Master Plinth	490 x 310 x 210mm	£26

A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive **£13**



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383**

Continued → → → → → → → → →



FREE
Monitor lead.
Please specify
type required
when ordering
your monitor.

Microvitec Monitors

- 1431 - Standard Resolution Monitor £169
- 1451 - Medium Resolution Monitor £209
- Cub3000 Medium Res for A3000 £189
- 1441 - High Resolution Monitor £359
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

- Eizo 9060S £389
- NEC 3FG £370
- NEC 4FG £465
- NEC 5FG £850
- VDC Enhancer Board £25
- NEC 6FG £1525
- Taxan 770LR £362
- Taxan 775 £362
- Taxan 795 £397
- Taxan 875 £685

(We will supply the Watford's superior Multiscan VDC Enhancer for Archimedes micro at only £10, if purchased with any Eizo or Taxan monitor.)

(P.S. Taxan 795 monitor is supplied with a FREE VDC enhancer board)

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro. Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

- BM7502 12" Hi-res Green Monitor £67
- CM8833 14" Med. Res Colour Monitor £167
- Dust Cover for Philips Monitors £6

STAR BUY

- PHILIPS 14" Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £166

Spare Monitor Leads

- BNC Lead for Zenith or Philips £3
- Skart Monitor Lead £5
- RGB lead for TAXAN Monitors £3
- Archimedes Colour Monitor Lead £7.50

Concept Keyboards

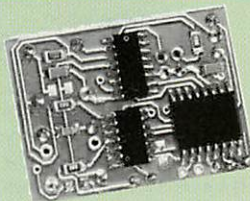
- Standard A3 Keyboard with BBC Software £138
- Standard A4 Keyboard with BBC Software £109
- Archi A3 Keyboard £139
- Archi A4 Keyboard £110

Aries 2000 Colour Monitor

This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video output. All controls are located on the front panel for ease of use. Ideal for BBC, BBC Master, Archimedes and Amiga.

A bargain at £159

VIDC Enhancer



This unique VDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

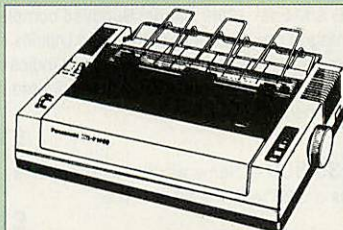
Super VGA VDC Card: A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control

£45

MultiVideo VDC Card: As above but for MultiScan monitors only.

£25

Panasonic Printers



- KX-P1123 £129
- KX-P1124i £173
- KX-P1170 £100
- KX-P1624 £272
- KX-P1654 *£335
- KX-P1695 £272
- KX-P2624 *£295
- KX-P2180 £165
- KX-P2123 £219

* Price includes 12 months On-site warranty

Cut Sheet Feeders

- P36 - 1124/24i £79
- P38 - P1624/95; P2624 £129
- P37 - 1123/70/80 £69

Buffers

- P12 4K Buffer Board for KX-P1081 £55
- P14 32K Buffer P1123/24/70/80 £16
- P1540/92/95; P1624/54/95

Serial Interfaces

- P19 for P1123/24/24i/70/80/1624/54/95/2624 £49

Citizen Printers

- 120D Plus £100
- 124D £145
- 224 £185
- PN-48 £209
- Swift 9 £134
- Swift 24E# £234
- Swift 24X £299
- PN48 Ribbon £4

FREE Colour Option with Swift 24E

- Swift 9 Colour Option £19
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4
- Citizen/Archimedes Colour Printer Driver £15

Integrex Colour Jet

- Colour Jet 132 Printer £449
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £21
- Black Cartridge £12.40
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123
- Colour Jet 2000 £POA

Star Printers

- LC15 £173
- LC20 £100
- LC24-10 £133
- LC24-15 £240
- LC24-20 £169
- LC24-200 £164
- LC24-200 Colour £203
- LC200 Colour £143
- SJ48 Inkjet £174
- XB24-200 Colour £295
- XB24-250 Colour £355
- XB24 Colour kit £29
- ZA200 Colour £234
- ZA250 £297
- Star/Archimedes Colour Printer Driver £15

Star Accessories

Cut Sheet Feeder

- LC10/200/24-10 £65
- XB24-10 £80
- LC15/LC24-15 £125
- XB24-15 £139

Serial Interfaces

- 8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Buffers

- 32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

- LC10; LC10-II; LC15 Black £4; Colour £6
- LC-200; LC24-200 Black £5; Colour £12
- XB24-10; XB24-15 Black £5; Colour £12

Laser Printers

All Laser Printers include 12 months On-site maintenance

- Brother HL-4 4ppm £594
- Brother HL4-V 4ppm £694
- Brother HL4-PS Postscript 4ppm £1079
- Brother HL8-V 8ppm £1044
- Canon LBP-4+ 4ppm £575
- Canon LBP-8 III 8ppm £970
- Canon LBP-8III Plus 8ppm £965
- Epson EPL4100 6ppm £550
- Epson EPL7500 6ppm £1150
- Epson EPL8100 10ppm £965
- HP Laserjet IIP+ 4ppm £625
- HP Laserjet III 8ppm £1015
- HP Laserjet IIID 8ppm £1499
- HP Laserjet IIIP 4ppm £705
- HP Laserjet IIIsi 16ppm £2525
- Panasonic KX-P4420 8ppm* £620
- Panasonic KX-P4450i* 11ppm* £925
- Panasonic KX-4455 Postscript 11ppm* £1450
- Panasonic KX-P4430 Satin Print* £999
- Star LP-8 III 2 8ppm £1249
- Star LP-8 III 8ppm £910
- Star LP-8 Star(post)script 8ppm £1140
- Star LP-4 4ppm £565
- Star LP-4PS Postscript 4ppm £779

* Now with 2 years On-site warranty

Laser Toners

- Canon 2, 3 & 4 £46
- Epson GQ £13
- EPL 4100 £59
- EPL7100 £82
- EPL7500 £99
- Star LP-8 £56
- KX-P4420/50 £19
- Laserjet HP IIP & IIIP £42
- Laserjet II/D, III/D £48
- Qume Crystal (3) £58

Laser RAM Upgrades

- IIP & III 1MB £51
- IIP & III 2MB £88
- II & IID 1MB £64
- II & IID 2MB £99
- II & IID 4MB £146
- Canon LBP4 1M £105
- Canon LBP8 2M £125
- EPL7100 256K £39
- GQ5000 512K £42
- KX4420/50 1M £75
- KX4420/50 2M £115
- KX4420/50 4M £195
- Star LP8 1M £139
- Star LP8 2M £275

Laser Drum & Developer

- Epson Drum GQ5000 £93
- Panasonic 4420 Drum £60
- Panasonic 4450 Drum £93
- Qume Drum £76
- EPL7100 £129
- Developer £59
- Developer £80
- Developer £56

Jetpage Postscript Cartridge

- HP IIP/III £225
- IID & IIID £227

Various Add-Ons

- Laserjet Appletalk Interface £135
- HP Adobe Postscript £399
- Pacific Page Postscript £259
- HP Premier Font Collection £28
- Laserjet various Font cartridges from £45

Hewlett-Packard Printers

• # Desk Jet 500	£285	• Paintjet XL	£1045
• Desk Jet 500 Col.	£449	• Quiet Jet Plus	£384
• Paint Jet Colour	£430	• HP Think Jet	£265
# 3 years extended Parts & Labour warranty	£49		
• DeskJet 500 Cart. Black	£15;	Colour	£27
• Paintjet Cartridges Black	£19;	Colour	£23
• Desk Jet 500 256K RAM cartridge			£99
• HP Epson FX Emulation Cartridge for Desk Jet			£59
• DJ 500 High Capacity Black Cartridge			£21
Plug In Font Cartridges for DJ 500			
• 22706B – Prestige, Elite, Line Draw fonts			£55
• 22706C Letter Gothic & HP Line Draw fonts			£56
• 22707P – Proprint Emulation Cartridge			£57
• Desk Jet Unlimited (Book No VAT)			£19.75

Canon Bubblejet Printers

Printer	CSF	D'ble	Ink
		Bin	Cart
BJ10EX	£183	£43	£16
BJ300	£289	£88	£12
BJ330	£380	£110	£12
BJC800C	£1419		
• Spare Battery pack for BJ10E			£33

NEC Pinwriter Printers

• P20	£180	• P70	£419
• P30	£240	• P90	£635
• P60	£325		
• P60/70 Colour Option Kit			£59
• Ribbons Black for P20/30	£6	for P60/70/90	£7
• Ribbons for P60/70/90 Black	£9	Colour	£13.50

Cut Sheet Feeders

P20 £59; P30 £85; P60 £89; P70/90 £80

Epson Printers

DFX5000	£1079	LQ1060 Colour	£595
DFX8000	£1960	LQ1070	£313
FX850	£264	LQ1170	£435
FX1050	£336	LQ2550+	£675
LQ100	£159	LX400	£101
LQ200	£162	LX850+	£140
LQ450	£165	LX1050	£206
LQ570	£205	SQ850	£432
LQ860 Colour	£444	SQ2550	£625
LQ870	£362		

Cut Sheet Feeders for

LQ570, LQ870	£47
LX400/850/LQ200/400/450/500/550	
LQ1010/1070/1170	£72
LX1050	£115
FX1050/LQ1060/SQ850	£128
FX1050/LQ1060/SQ850	£155
LQ2550	£299
SQ2550	£210

Tractor Feed for

LQ800 £44; LQ850/FX850 £69; LQ1050/FX1050 £85; LQ2500 £90; LQ2550 £90.

Accessories

• EX800/1000 Colour Option	£45
• EX800/1000 Colour Ribbon	£14
• LQ2500 Colour Option	£65
• Multifont Card for LQ550/850/1050	£95

Epson Printer Interfaces

RS232	£28	RS232 + 2K Buffer	£52
-------	-----	-------------------	-----

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£4
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Plotters

• HP7440AU	£525	• HP7475AU	£715
Roland Plotters			
• DXY1100	£490	• DXY1200	£620
• DXY1300	£825	• DXY2500	£2345
• DXY3500	£2955	• Sketchmate	£310
• Roland plotter Pens, Fibre tip			£7.50

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
• 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
• 1,000 Sheets 15" x 11" Fanfold Paper	£9
• 2,000 Sheets 15" x 11" Fanfold Paper	£16
• 1,000 Sheets true A4 Fanfold Paper 70gms	£11
• 2,000 Sheets true A4 Fanfold Paper 70gms	£21
• Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	£13.50
3000 70 x 37mm (3 Rows)	£13.25
2625 70 x 42mm (3 Rows)	£13.00

Printer Ribbons & Various Dust Covers

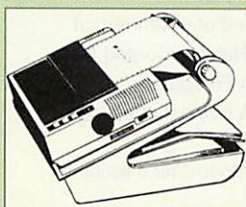
Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
DMP4000	£3.75	£4.85
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet		
Cartridges (set of 4)	£6	

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595	£6
P115 for KX-P1180	£7
P140 for KX-P1540	£8
P145 for KX-P1124	£7
P155 for KX-P1624	£8
Colour Ribbons for KX-P1081, 1592 & 1595	
Brown, Blue or Red	£9 each

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr £3)
132 Column version £29 (carr £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£10	£11
• 3 to 1	£13	£14
• 4 to 1	£16	£17

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

2 Way Compact Printer Switch

A handy 2 way printer switch can be attached to the micro or monitor for ease of use.

• Centronics £18; • Serial £17
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

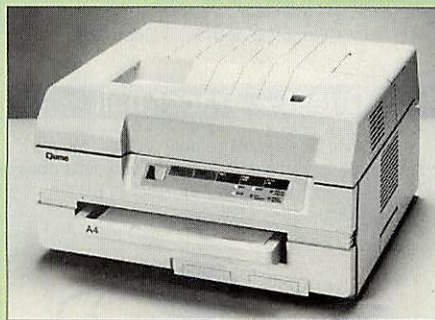
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

• 2 In/2 out	£135	• 4 In/2 out	£169
• 8 In/1 out	£199		

Compact Converter Units

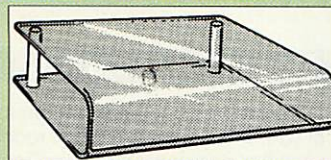
Serial to Parallel £36 Parallel to Serial £37

Laser Direct



- Laser Direct Qume 6ppm complete £749
- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £315
- LPB 4 Printer plus High Res Card £875
- LPB 8III Printer plus High Res Card £1275

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version £16 (carr £3)
136 Column version £20 (carr £4)

Continued → → → → → → → → →

QUEST MOUSE Mk III



- Quest Mouse III & Quest Paint £59
 - Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
 - Quest Mouse III only £30
 - Quest Paint Software only £34
 - Quest Font Disc (22 Text Fonts) £15
 - Quest Mouse Mat (Red or Blue or Green please specify) £3
 - Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18
- (P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

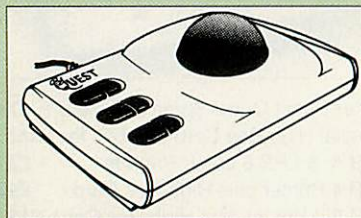
ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

- ConQuest ROM Package £30
- (Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



- QT-10 BBC/Master Version £25
- QT-20 Archimedes Version £26

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

Mk II Light Pen

Ideal for BBC B and Master. Price includes software on disc and operating manual £17

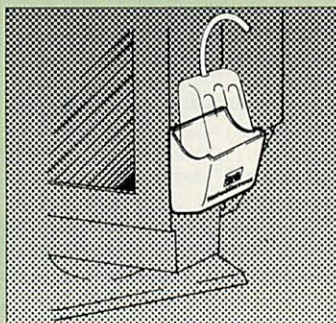
Mk III AMX MOUSE

- AMX Mouse plus Super Art £54

(Please specify for BBC, Master or Compact)

- AMX MOUSE ONLY £29
- AMX SUPERART Package £29
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £34
- AMX XAM Educational £15
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

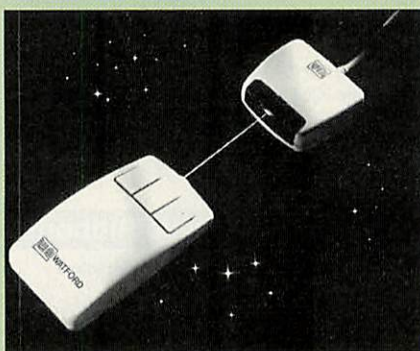
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse

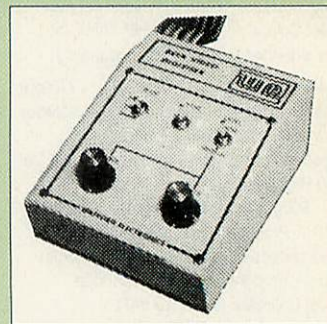


Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £59

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine. Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

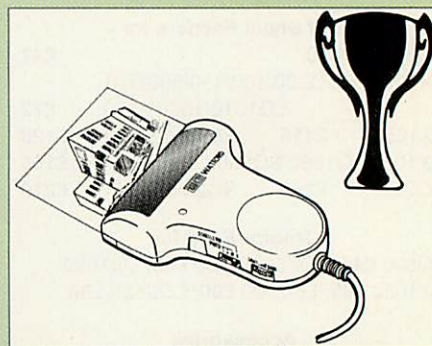
£99

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Beeb Hand Scanner

Hand-held Scanner for the BBC Micro

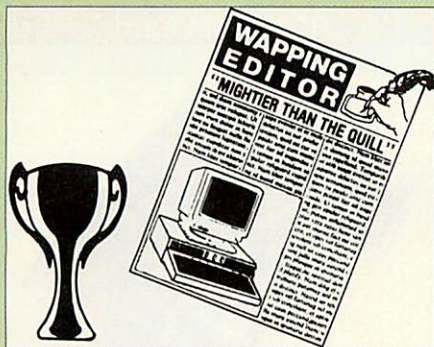


Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £99



**Winner of the BBC Acorn User 1990
Award for the Best DTP/Word Processor**

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, ellipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be - it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack £59
Wapping Editor plus Mouse £79

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages laid out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.

Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.

Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the IHELP application on the Acorn applications discs.

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

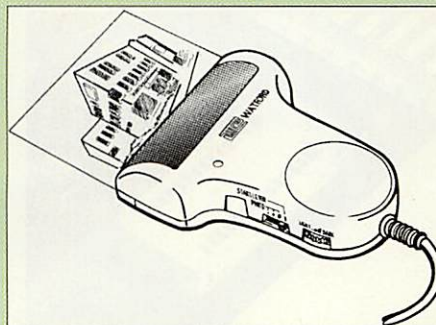
New Low Prices:

Archi A4 Scanner **£269**
Sheet Feeder for above **£75**
Scanner + Sheet Feeder **£359**

Computer Concept Scanlight

• Scan-Light A4 **£275**
• Scan-Light A4 + Sheet Feeder **£368**
• Scan-Light Junior mono **£130**
• Scan-Light Junior 256 **£197**

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £119. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are:

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

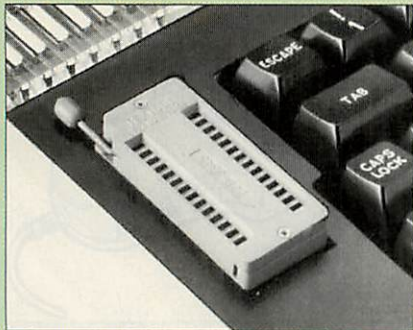
On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version £119

AHS-3 Archi A3000 Version £129

Continued → → → → → → → → →

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the Keyboard.

- We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- BBC, B and B+ compatible.

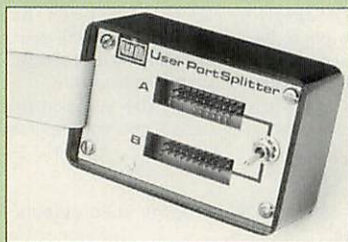
£18

ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin £8; Quad £13

User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

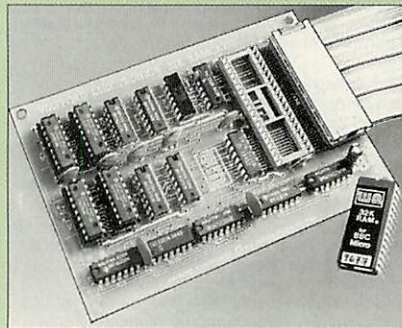
Excellent Value at £22

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.

- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).

- Unique facility to turn ROMs off and on again.

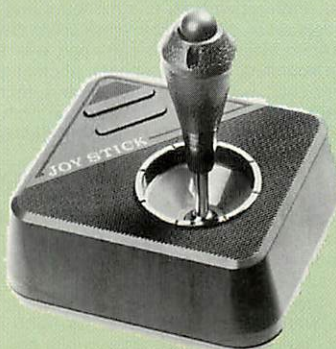
Only £54

(Price includes a comprehensive manual and the ROM)

- ARIES B-32 Shadow RAM Card

£55

Commander Joystick



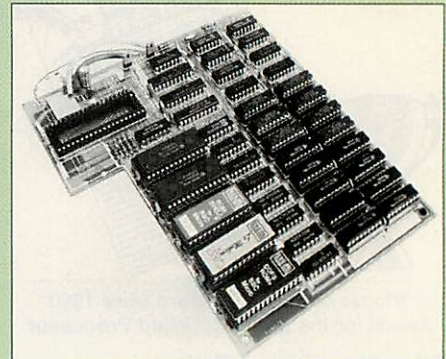
Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

ROM/RAM Card



- NO SOLDERING required to fit the board.
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM.
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD & F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

PRICES:

- | | |
|---|-----|
| • ROM/RAM card with 32k DRAM | £42 |
| • ROM/RAM card with 64k DRAM | £54 |
| • ROM/RAM card with a massive 128k DRAM | £89 |

OPTIONAL EXTRAS:

- | | |
|---|---------|
| • 16k plug-in Static RAM kit | £8 |
| • 16k DRAM for Upgrade | £13 |
| • Battery backup | £3 |
| • Read and Write protect switches | £2 each |
| • Complete ROM-RAM card with all options fitted | £109 |

Voltmace Joysticks

- | | |
|--|-----|
| Delta 3B Single Joystick | £10 |
| Delta 3B Twin Joysticks | £15 |
| Delta 3C Joystick for Compact | £10 |
| Delta 14B Single Joystick | £11 |
| Delta 14B/1 Adaptor Module | £12 |
| Transfer Software Disc-Tape | £7 |
| Delta-Cat A mouse eliminator Joystick for the Archimedes | £24 |

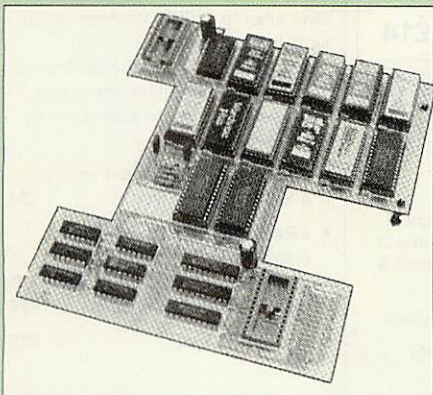
Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128

£25

Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card are:

- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35

Battery Backup fitted **£39**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£20.00**
- Maths with a Story 2 (Disc). 4 further maths programs. **£20.00**
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. **£17.00**
- POLYMERS O-Level program. **£20.00**
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20.00**
- ADVANCED TELETXT SYSTEM **£8.65**
- PERIOD TABLE SOFTWARE **£20.00**
- Computers at Work - Primary **£17.35**
- Electric Fields 6-14 years **£11.25**
- Espana Viva - 3 Discs **£19.95**
- WHITE KNIGHT Chess game **£16.00**
- A Vous La France **£29.00**
- FUN SCHOOL 2 - Red: Under 6 yrs **£12.00**
- FUN SCHOOL 2 - Green: 6-8 yrs **£12.25**
- FUN SCHOOL 2 - Blue: 8 yrs+ **£12.50**
- FUN SCHOOL 3 - Red **£18.50**
- FUN SCHOOL 3 - Green **£18.50**
- FUN SCHOOL 3 - Blue **£18.50**
- Six French Games - Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ **£26**
- More French Games - Another 6 games 12 years+ **£26**
- Au Restaurant and Accident de Route 12 years+ **£26**
- Boulogne and Oh-Les - 2 programs for beginners **£26**

- Letters to French Penpals - 11 years+ **£26**
- French Programs with Henri Beret - The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 **£22**
- Six German Games - Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ **£22**
- More German Games - Aimed at pupils in their 2nd year of learning German. 12 years+ **£22**
- An Introduction to Electronics - Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years **£26**
- Computer Control - This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years **£26**
- PUNCMAN Learning punctuation
Puncman 1 & 2 for 7 - 13 years **£15**
Puncman 3 & 4 for 8 - 14 years **£15**
Puncman 5 & 6 for 8 - 15 years **£15**
- Yes Chancellor - A chance to take over number 11 at Downing Street. 12 years+ **£18**
- Letters & Pictures - Introduces phonic skills to Infants 6-8 years **£15**
- Numbers & Pictures - Early number learning is a great fun (4-6 years) **£15**
- Note Invaders - Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) **£15**
- Maps & landscapes No. 1 (9-14 years) **£18**
- Help Your Child learn Basic Map work No. 2 (9-14 years) **£18**
- Pirate - Educational Adventure (8-14 years) **£15**
- Spelling Week by Week (6-14 years) **£18**

Archimedes Software

- Animated Alphabet (3-6 yrs) **£21**
- Arcventure (8-12 yrs) **£29**
- Bookbinder **£43**
- Bumper Disc **£14**
- Bumper Disc 2 **£14**
- Craftshop 1 **£26**
- Craftshop 2 **£26**
- Converta-Key **£16**
- Data Word **£16**
- Desktop Stories **£35**
- DigiSim **£35**
- Dream Time (5-7 yrs) **£23**
- Droom **£19**
- Farm (5-7 yrs) **£19**
- Fleet Street Phantom (9-13 yrs) **£25**
- Fun School 2A Red (up to 6 years) **£12**
- Fun School 2A Green (6-8 years) **£14**
- Fun School 2A Blue (8 years +) **£14**
- Gate Array Teaching System **£68**
- Glimpse Clip Art Utility (7-16 yrs) **£8**
- Highlighter (6-16 yrs) **£42**
- Jiglet **£27**
- Jigsaw **£28**
- Mapventure (9-13 yrs) **£24**
- Microbugs **£24**
- Money Matters **£16**
- Nature Park Adventure (7-9 yrs) **£27**
- Numerator **£60**
- Picture Book **£16**
- Recall (6-13 yrs) **£39**
- Sellardore Tales **£24**
- Snippet **£26**
- Space Mission Mada (9-13 yrs) -
- Sting of the Dump (9-13 yrs) **£22**
- Target Maths **£16**
- Viewpoints (9-12 yrs) **£33**
- Wizard's Revenge (7-10 yrs) **£17**
- Worst Witch (7-10 yrs) **£25**

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	-
6 way Power Connector	120p	150p

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK

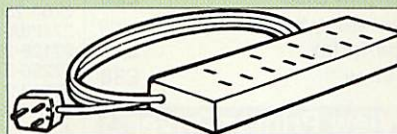
£8

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage transient spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

£16

28pin DIL Header Plug

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 Way DIP Switch

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only £1.00

28 pin ZIF SOCKET (Textool) **£6.95**

Continued → → → → → → → → →

Computer Concept's ROMS

Disc Doctor	£18
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42

Wordwise plus

£40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

This advance utilities ROM extends the power of your Wordwise plus ROM.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

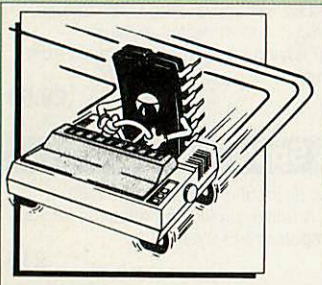
Only £24

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
Viewsheets (Acornsoft)	£36
Viewstore	£36
Viewspell - 80T disc	£25
Viewplot Disc	£20
(Please specify for Master 128 or Compact)	
View-Index	£12
Hi-View	£38

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

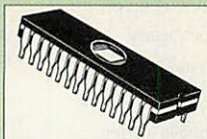
Price: Only £29

Mini Office 2 - Disc

for BBC B & B+	£12
for BBC Master	£14
for BBC Compact	£16

(When ordering please specify for which Micro & 40 or 80T Disc)

Assorted ROMS



ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£36
Acorn LISP	£19
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
Beebmon	£22
Communicator	£49
Dump Out 3	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Micro Prolog	£25
Microtext Disc	£46
Microtext Rom	£199
Numerator - Archi	£69
Numerator - BBC	£39
Pendown ROM	£32
Rom Manager	£20
SERIAL ULA	£13
TED	£35
Termulator B, B+	£28
Termulator Master	£32
Video ULA	£14
1Mb OS ROM	£39

CHIP SHOP

1 MB-10 DIL D-RAM	£4.50
1 MB ZIF D-RAM	£4.00
256K x 4-8 DIP	£4.75
256K x 4-8 ZIF	£4.00

SIMs and SIPs

256 x 9-8	£11
1Mb x 9-10	£26
1Mb x 9-8	£39
DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£3.00
27128A-250n (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
4816 RAM	£2.00
41256-8	£2.00
41256-10	£1.50
6264LP-8K	£4.00
6502A CPU	£5.00
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£4.00
6522A	£5.00
62256ALS-15	£10.00
62256P-12	£8.50
6818	£4.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
74LS10	50p
74LS123	£1.00
74LS163	£1.00
74LS244	£1.00
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	£1.00
75159	£3.00
8271	£39
9637	£2.00
ICL7673PA	£3.00

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £14

OFFICE MASTER

CASHBOOK - A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business.

FINAL ACCOUNTS - Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST - A very versatile program.

EASILEDGER - Provides instant management information.

INVOICES & STATEMENTS - Has VAT routines and footer messages facility.

All this for only £21 (Disc)

OFFICE MATE

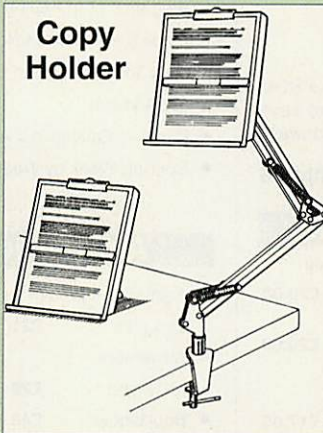
DATABASE - Set up a computerised card index system with powerful search facilities.

SPREADSHEET - Offers many calculation and editing features

BEEBLOT - Provides visual representation from Spreadsheet data.

Only £10 (Disc)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip.

Desk Top £8

Angle poise £12

NEW Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.)

Desk Top £15

Angle poise £20



CREDIT CARD

24 HOUR



Ansaphone Hot Lines
(0923) 50234 or 33383

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs!

The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

• **ERASER EB** - Standard version erases up to 16 chips. £34

• **ERASER GT** - Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. £36

• Spare UV tubes. £12

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. £2

Metal Chip Extractor £3

Servisol Foam Cleaner

This king size multipurpose foam cleaner spray is ideal for cleaning Keyboard, Monitor, Disc Drive & Computer furniture surfaces. £2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens. £2.50

Aerosol Dust Spray

Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. £3

PC Cleaning Kit

To avoid data corruption and trouble free use of your PCs, it is advisable to clean your PC System once a week. Our Kit 14 is ideal for the purpose. **Kit 14** - 1 each, 3.5" & 5.25" Cleaning Disk, 2 cleaning pads; Drive head cleaning fluid; 20pcs general purpose wipes; Anti-static screen cleaning fluid; General surface cleaning fluid and a transparent plastic case which can hold ten 5.25" Disks when empty. £10

Spares for BBC Micro

UHF Modulator	£4
Speaker Grill	£1
Speaker	£3
Keyswitch	£1.50
Master PSU	£59
Master Keyboard	£62
Master Casing	£49
16MHz Crystal	£2
17.734 MHz Xtal	£2
32.768MHz Xtal	£1
BBC B Refurbish Casing	£25
Keyboard	£46
Power Supply	£59
Replacement Flexible 17 way Keyboard Connector	£4

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£6.95
15 Hr Wordprocessing BBC/VW & VW+	£6.95
30 Hour BASIC (BBC Micro)	£12.95
1st Word Plus Rel. 2 Manual	£10.00
A3000 Technical Reference Manual	£29.00
Acorn DTP A Guide to	£17.00
Advanced User Guide for BBC	£10.95
Archimedes 1st Step – Beginners Guide	£9.95
Archimedes Assembly Language	£14.95
Archimedes BBC Basic Guide	£20
Archimedes DTP Manual	£10.00
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference Manual	£79.00
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
Basic V – A Dabhand Guide	£9.95
BBC Micro – Within the	£11.95
BBC B Micro User Guide	£15
BCPL User Guide	£9
C Big Red Book of	£8.95
C – A Dabhand Guide to	£14.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Deutsch Direkt! (Book only)	£5.95
DISC FILING SYSTEM (DFS)	
Operating Manual for BBC	£6.95
FORTH on the BBC Micro	£9.95
ISO-PASCAL Reference Manual	£9.95
Master 512 Guide – Dabs Press	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual – Advanced	£17
MINI OFFICE II – A Dabhand Guide	£9.95
Mouse User Guide to BBC Micro – the Complete	£5.95
Example Programs on Disc for above	£4.95
PASCAL Programming	£10.95
Risc OS Style Guide	£9.95
RISC Technical Manual 260 pg	£14.95
The Epson FX-KAGA PRINTER	
Commands REVEALED	£5.95
Understanding Interword – A Beginners Guide	£4.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£5.00
View, Viewsheet & Viewstore – Mastering	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Z88 – A Dabhand Guide	£14.95
Z88 Computing	£9.95
Z88 Magic	£14.95

BOOKS for IBM PC & Compatibles

1-2-3 For Business	£25.95
1-2-3 Mastering Release 3	£22.95
1-2-3 Mastering – 2nd Ed.	£22.95
1-2-3 Quick Reference	£8.45
1-2-3 Using – Rel. 3	£25.95
8086/8088 Ass. Language Quick Ref	£8.45
8086/8088 Programming the	£17.95
Accountancy software in Business – Using	£14.95
Agenda – Using	£21.95
Aldus PageMaker 4	£21.95
Aldus PageMaker – Using	£21.45
Amstrad 9512 – Using the	£10.95
Amstrad Basic 2 User Guide	£9.95
Assembly Language Quick Ref	£8.45
Autocad 4th Ed – Mastering	£31.50
Autocad – Mastering Through Rel. 10	£28.95
Autocad – Inside Release 11	£32.45
Autocad – Inside 6th Ed	£36.95
Autocad – Mastering Through Rel II	£28.95
C Introducing	£12.95
C Programming Language 2nd Ed	£26.95
C – Teach Yourself	£19.95
Clipper – Using 2nd Ed	£22.95
Computer Users Dictionary	£9.95
Corel Draw 2nd Ed Mastering	£26.50

Corel Draw Quick Ref Thro V1.2	£7.95
Corel Draw made easy	£19.95
Corel Draw v2 Quick Ref	£8.45
dBase 3/4 Complete Ref	£27.45
dBase III Plus – Complete Reference	£19.95
dBase III Plus Handbook 2nd Edition	£22.95
dBase Instant Reference (III & III+)	£10.95
dBase 4 – Handbook	£21.95
Desk Jet Unlimited	£19.95
DOS & BIOS Function – Quick Ref Guide	£7.95
DOS Instant Ref.	£9.75
DOS Instant Reference (up to 3.3)	£6.95
DOS Power Tools	£46.45
DOS – Programmers Ref. Manual 2nd Ed	£25.95
Excel for Windows – Quick Ref.	£8.95
Fax – Management with	£7.95
FAX – Managing with	£12.95
Framework III – Mastering	£24.50
GW Basic Users Guide & Ref	£12.95
Hard Disc Instant Ref	£10.95
Hard Disc management – Quick Reference Guide to	£4.95
Hard Disc – Using Your	£27.45
IBM PC & PS/2 – Inside the 3rd Ed	£21.70
Microsoft GW BASIC	£17.95
Microsoft Windows 3 – Using 2nd Ed	£20.95
Microsoft Windows Illustrated	£21.95
Microsoft Word 5.5 – Using	£20.45
MS-DOS – ABC's of 2nd Ed.	£17.95
MS-DOS Bible 3rd Edition	£22.95
MS-DOS First Book	£15.50
MS DOS for Beginners	£17.45
MS-DOS Quick Ref Guide 5	£8.95
MS-DOS – Running 4th edition	£19.95
MS-DOS – Supercharging 2nd Edition	£17.95
MS-DOS Users Guide 3rd Edition	£27.95
MS-DOS – Using	£21.95
MS-DOS 5 – Quick Start	£18.45
MS-DOS 5 User Hand Book	£19.95
MS-DOS 5 – Upgrading to	£14.95
MS-DOS 5 Using	£29.95
MS-DOS Tricks & Tips	£16.45
Network User Guide	£23.95
Networking Personal Computers 3rd Ed.	£20.95
Norton Utilities – Inside the	£21.75
Novell Network – Mastering	£27.95
Novell Network – The ABC of	£21.95
Novell Network – Using	£27.45
PageMaker on IBM PC – Using	£22.95
PageMaker – Using	£22.95
PCs & Compatible Computers for Beginners	£17.95
PC Crash Course 2.0 2nd Edition	£19.95
PC Tools – Quick Ref	£8.45
Programming Guide to EGA & VGA Cards	£25.95
Quattro – Mastering Pro 3	£21.95
Quattro Pro III – Using	£25.95
Quattro Pro Quick Ref.	£8.45
Smart – Using	£21.45
Smartware II – Mastering	£22.95
Smartware II – Using	£27.45
Smart, tips, tricks and traps (QUE)	£22.95
Supercalc 5 – Using	£27.45
Supercalc Professional	£17.95
Symphony Made Easy	£15.95
Symphony – Using Special Ed.	£27.45
Symphony 4th Edition – Mastering	£24.95
Turbo C Bible	£27.95
Turbo C++	£22.95
Turbo Pascal 5 – Using	£22.95
Turbo Pascal Using	£27.45
Unix – Using	£27.45
Upgrading & Repairing PC's	£27.45
Ventura Mastering – 2nd Ed.	£22.95
Ventura Publisher – Using	£22.95
Ventura – Instant Reference	£10.95
Ventura – 3rd Edition	£24.95
Window Programming 2nd Ed	£27.95
Window 3.0 Programming	£27.95
Window 3.0 Quick Ref.	£7.95
Word for Windows made easy	£15.95
WORD for Windows – Using	£22.95
Wordperfect – Illustrated	£21.95
Wordperfect 5 – Using	£22.95
Wordperfect – Quick Reference V5	£8.45
Wordperfect 5.1 – ABC's of	£18.95
Wordperfect 5.1 – 1st Book of	£15.95
Wordperfect 5.1 – Mastering	£24.95
Wordperfect 5.1 Quick Start	£18.45
Wordperfect 5.1 – Using Special Ed	£25.95
Wordperfect for Beginners	£17.45
Wordstar & CPM Made Easy	£15.75
Wordstar Using 5.5 & 6 3rd Ed	£25.95
Wordstar 6.0 Made Easy	£15.95

Carriage on Books vary between £2 to
£4.00, depending on their weight

New Release ACORN TO PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quickly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered. 'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £12.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc. and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: £14.95 (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Designed for program authors to convert BBC programs to run on IBM PCs.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

Beeb DOS is a collection of utilities which run on the PCs and enable it to read and write information on BBC Discs.

Price: £39

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

£5.95 (No VAT)

Continued → → → → →

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the module expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELOCK and *IDEUNLOCK, ideal for educational establishments where hacking or tampering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELOCK as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£249
ADA 0530	100Mb	16mS	£379
ADA 0570	200Mb	15mS	£499
ADA 0580	330Mb	15mS	£895

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 £85

Internal Hard Disc Drives for A3000

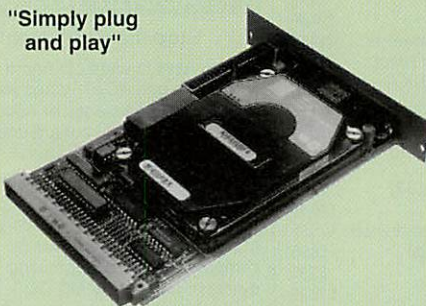
State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0700	21Mb	23mS	£185
ADA 0720	44Mb	19mS	£385
ADA 0750	60Mb	18mS	£425
ADA 0730	89Mb	18mS	£685

Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug
and play"



Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install – you simply slot one into any vacant module backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted – ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	£199
ADA 0660	44Mb	28mS	£375
ADA 0670	89Mb	18mS	£675

(Can be used as a Removable Hard Drive)

NEW Archimedes A300/A400 SCSI Hard Disc Offer (while stocks last)

100MB Hard Disc Upgrade
complete with Controller card,
Cables, Formatter and Manuals

RRP: £999

Offer Price: £399



**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 250234 or 233383**

Syquest Removable Disc Units

These Hard Drive units are supplied complete with a cartridge 42Mb removable, cables and a high flow fan for cooling.

• Syquest Drive Unit pack	£399
• As above + SCSI Card	£535
• Spare 42Mb Disc	£55

NEW Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the mouse.

Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £59

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- Apple Approved Dealer
- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Citizen Printers Special Dealer
- Computer Concept Premier Dealer
- EIZO Monitor Dealer
- Fujitsu Printers Premier Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Premier Dealer
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor



Watford Electronics

250 Lower High Street, Watford WD1 2AN, England
Tel: 0923 237774/240588 Fax: (0923) 233642 Telex: 8956095



Prices subject to change without notice and available on request. ALL OFFERS subject to availability. Mail Order and RETAIL SHOP. Trade and Export inquiries welcome. Government and Educational Establishments' OFFICIAL ORDERS Accepted. Shop Hours: 9.00am to 6.00pm, Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park). VAT: UK customers please add 17.5% VAT to cost incl. Carriage. CARRIAGE: Unless stated otherwise, minimum £3 on all orders. £4 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost. Specifications of all products are given in good faith but are subject to change without notice. Some items vary in their availability. Watford Electronics Terms and Conditions are available upon request. Please ring for latest delivery situation.

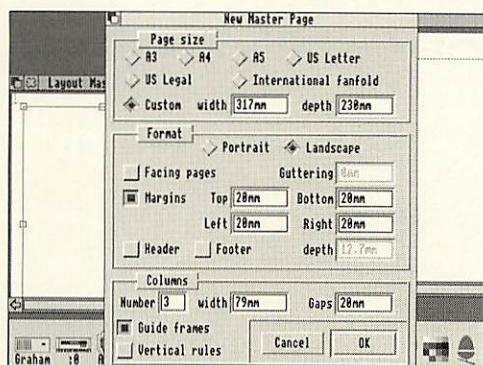
Computer Concepts' *Impression* has become probably the best-selling application for the Archimedes micros, with over 15,000 copies sold and a small industry of books, training courses and other resources forming around it. It has developed steadily over a two-year period, and now stands at version 2.16. *Impression's* abilities stretch from simple wordprocessing and letter writing to professional black and white publishing. Indeed *Acorn User* itself is created using it.

But it is a complex package, and few use – or need – all of its capabilities. Fortunately, it's also an application that can be tackled a bit at a time – you don't need to understand all of it before you begin. Here is a selection of hints, tips and advice on good practice. The example is an information leaflet, a single A4 sheet printed both sides, and folded twice to give a standard six-page leaflet. It uses many of the techniques and tips described in the boxes.

STEP ONE: THE MASTER DOCUMENT

To make up a leaflet like the one in our example, fire up *Impression* in the usual way. A click on the icon creates a new document. The first step to creating the leaflet is to create the master page design. On *Impression's* Edit sub-menu, click View master pages, then press Menu again to choose the New master page option.

The dialogue allows you to set up the page size and margins for the leaflet: it's landscape and slightly bigger than A4. The margins are 10mm all around, plus an extra 10mm for the crop marks and bleed allowance, but you don't need to set these up. Notice how the Guide frames button is pushed, so that guides rather than real frames are created on the master page. Click Okay and note the ID number of the new master you've created.



Creating the new master page

STEP TWO: ADDING FRAMES

Still on the new master page, the next step is to add the tiny frames in the corner that hold the crop marks, and a guide frame 297 x 210mm to show the real edge of the paper. You can at this point close the Master page window. To make the main document, follow the new master page design, choose the Alter chapter dialogue, and change the master page number to that of the new master design. Make sure that you save your work at this point.

Since this is to be a six-panel leaflet, click on any of the guide frames, then choose Insert new page from the Edit sub-menu. Now draw the six real frames in. Remember the key shortcut for

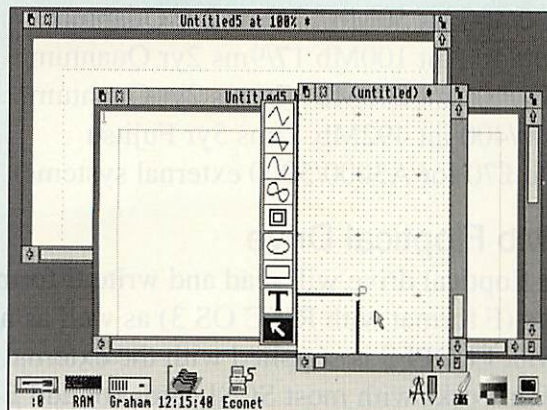
GOOD IMPRESSIONS

Graham Bell shows you seven key steps to create an *Impression* document that will demonstrate the package's range of advanced features

CROP MARKS

Some documents call for bleed: that is, some parts of the page design will go right up to the edge of the paper. Yet on most printers, you can't print right up to the edge, so you have to print on paper that's larger than the final size and trim the excess off. Crop marks are tiny ticks to show where the paper is supposed to be trimmed. A 'bleed allowance' is when you take a feature slightly beyond the crop marks: that means if the trimming isn't quite accurate, there won't be a white line beyond the black.

Impression has the ability to put crop marks on automatically – there's a button in the Print setup dialogue. But these are off the page, so you can't make any bleed allowance. The solution is simple: make up all your pages 20mm larger in both dimensions than the finished document. Then put tiny frames in each of the corners of the page to hold your own crop marks, and you've got a 10mm bleed allowance.

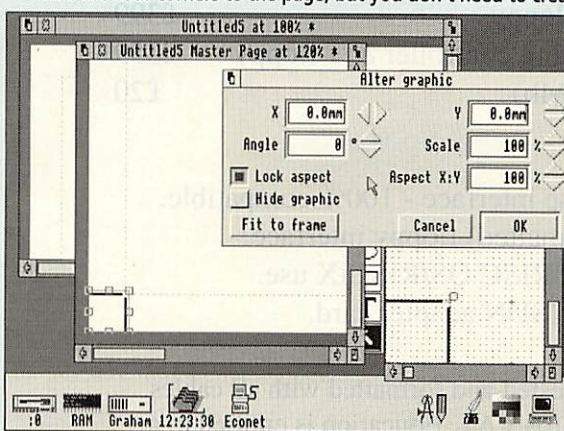


First make up a Draw file with the crop mark pattern shown. Make the pattern 10mm in each dimension, make the lines 0.25 or 0.5pt thick, and put the pattern exactly at the bottom left of the page.

Then, on the *Impression* master page, put an 11mm frame in the bottom left corner of the page. Make it transparent, non-repelling, and drag the Draw file into it. Now go to the Alter graphics dialogue, and make sure the scale is 100% (it will be bigger, so reduce it). Press OK. Go back to the Alter graphics dialogue and adjust the X and Y offsets to 0mm.

There are four corners to the page, but you don't need to create four drawings: you can 'flow' the drawing from one frame to another (select one frame then click Adjust on the other frame), and rotate it to suit the other corners. You'll have to sort out the offsets too.

When you print your A4 document with crop marks, they probably won't be shown, because they are off the page. But you can see them if you print at 90% scale, or on a larger format printer.



ARCterm 7

£68

This new release of our popular comms package now supports Minitel emulation and includes an Econet modem server. Recommended by Hampshire LEA. Existing users return both disks and SAE for upgrade.

A5000 IDE drives

These drives fit in the second floppy slot, in addition to the existing 40Mb drive. Transfer rate is 1050k/s.

A5000 internal 120Mb 17/9ms Quantum	£289
A5000 internal 240Mb 17/9ms Quantum	£489

IDE

Complete systems. MEMC1a/backplane required. Typical transfer rates are 700k/s for 40Mb and 900k/s for 100Mb.

A300/400 internal 20Mb 25ms Conner	£139
A300/400 internal 40Mb 28ms cached Seagate	£219
A300/400 internal 100Mb 17ms cached Seagate	£299

SCSI

We supply Morley cards - the fastest on the market. Typical transfer rates are 1000k/s for Quantums and 2150k/s for Fujitsu. All drives are cached. Add £50 for a cached SCSI card if you require one.

A300/400 int 50Mb 17/9ms 2yr Quantum	£319
A300/400 int 100Mb 17/9ms 2yr Quantum	£429
A300/400 int 200Mb 17/9ms 2yr Quantum	£699
A300/400 int 492Mb 12ms 5yr Fujitsu	£1199
(Add £70 for A3000/5000 external systems)	

20Mb Floptical Drive

Our floptical drive will read and write E format disks (F format with RISC OS 3) as well as native 20Mb. FLOPFS is supplied with the external drive which works with most SCSI cards (or add £100 for a Morley card). The A5000 internal comes with our own SCSI interface designed specifically for the floptical drive, plugging into the Econet port - using no slots. Transfer rate is 100k/s typically & 80ms seek time.

External including 1 floppy	£399
Internal A5000 including controller & 1 floppy	£359
Floptical floppies (20Mb)	£20

Coming soon

- IBM keyboard/mouse interface - 100% compatible.
- 1/2/4Mb (3.2Mb formatted) floppy interface.
- 8-port serial card for RISC OS/RISCiX use.
- 64kBit synchronous ISDN adapter card.

All disk systems come tested and formatted with all cables. Delivery on hardware £10+VAT. Education is entitled to a 5% discount on all products.

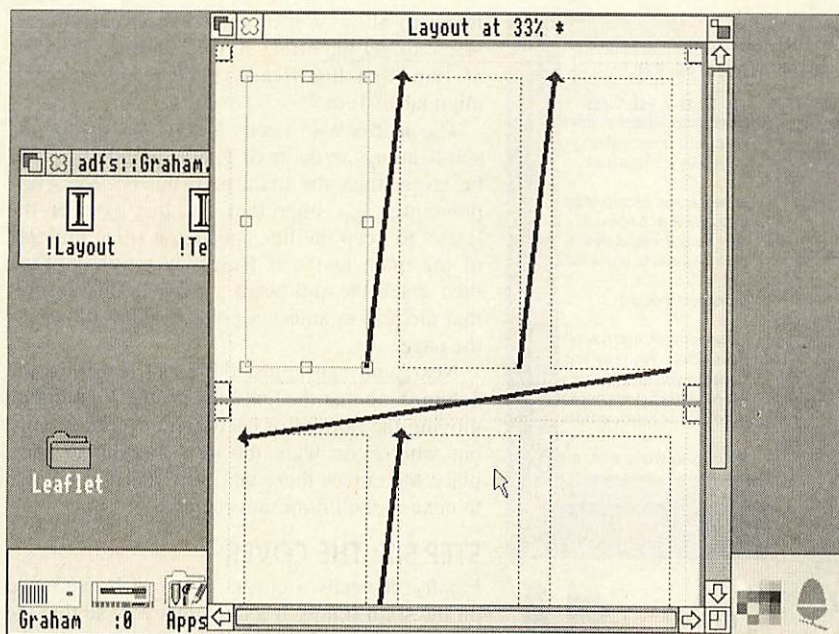
Please add VAT at 17.5% to all prices. Plastic welcome.

THE SERIAL PORT



The Serial Port
Burcott Manor, Wells,
Somerset, BA5 1NH

Telephone	(0749) 670058
Fax	(0749) 670809
Modem	(0749) 670030



Crop marks, text frames and text flow are set up first

inserting a frame is **Ctrl-I**, but you could also draw the first, then copy (with **Ctrl-C**) and paste it five times (with **Ctrl-V**). Make sure Snap to guides is on first – it should be ticked on the Frame sub-menu.

To link the frames so that the text flows automatically when it's imported, Select the first frame on page one, then click Adjust on the next four. It's easiest to do this when you can see the whole document, so change to a small scale beforehand, with **Shift-F3** or the Scale view dialogue (**Ctrl-F9**). Leave the last frame on the second page unlinked, as this will become the cover of the leaflet. The Show flow option on the icon bar menu confirms the way the frames are linked.

STEP THREE: THE BASESTYLE

If you have a good idea of what your document will look like, then this is the time to set up some of the style sheets. These control details of the look of the text – how big and in what typeface. This simple leaflet needs only a few styles.

Remember that the main text in a document should be defined in *Impression's* Basestyle, and all the rest of the styles should be modifications of that. So in this case, press **Ctrl-F6** to enter the Style editor. Basestyle is set up to give Homerton.medium, at 10pt on 12pt line spacing (otherwise known as 2pts of extra leading). Space above paragraphs is set to 12pt too.

You can remove all the tabs from the ruler by dragging them a little way upwards, away from the ruler scale. The rest of the Basestyle can be left alone. The two Italic and Bold styles can be set to change the typeface to Homerton.medium.oblique and Homerton.bold respectively, but they shouldn't change any other attributes. Leave all the buttons on the style editor unpushed except for 'font name'.

The styles are layered on top of one another, so that any Italic text will inherit everything except its typeface from the underlying Basestyle. If there's a lot of bold or italic text, it's useful to make a function key give each of these styles: conventionally Italic is attached to

WORD FOR WORD

If your document contains a lot of text – more than just a few hundred words – then it is not sensible to type all of that directly onto your finished page design. The job of text creation and page layout should be done separately. It's worth using a wordprocessor to create the text.

The best way is to create two documents, one which has the page structure set up for your real document, and one which has a simplified page layout for wordprocessing plain text. You can load both at once, type your text into one, then cut and paste the text from one on to the real document.

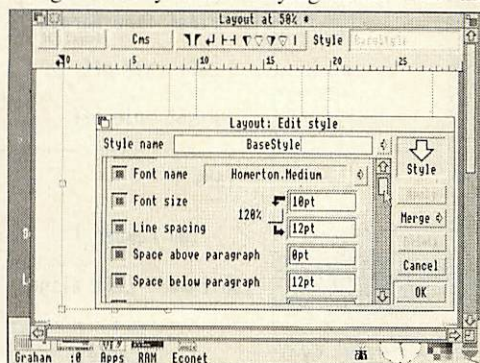
When creating a template document, don't just add your styles and master pages to the existing ones. It reduces the size and complexity of your files if you delete the unnecessary styles. So if, like the example leaflet, there are only a few styles of type that you need, then delete all the built-in ones like 1inch indent and Hanging indent first – there's a Delete button in the Style editor dialogue box. If you create both your wordprocessing and page layout templates with the same set of style names, then the text will automatically set into the right style when you cut and paste.

The styles don't need to be the same – they just have to have the same names – so the wordprocessing styles can be 'tuned' for readability on the screen by using Homerton medium at 14point size for example, even if the real page layout specifies Pembroke at 9point.

B and **Bold** to **F4**. This is achieved using the Style control at the very bottom of the style editor dialogue.

STEP FOUR: ADDING TEXT

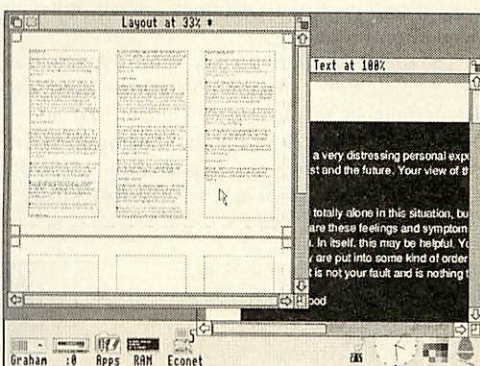
The text can be written directly into the frames on the leaflet pages. But this isn't a good idea – you should not be concerned with the page design when you're worrying about what the



Setting up basestyle with the style editor

words should be. And the details of the design, perhaps involving narrow columns, might not be best suited to wordprocessing. An ideal method is to create a separate *Impression* document called Text to use as a wordprocessing document – one with a straightforward, single-column layout and clear, readable text.

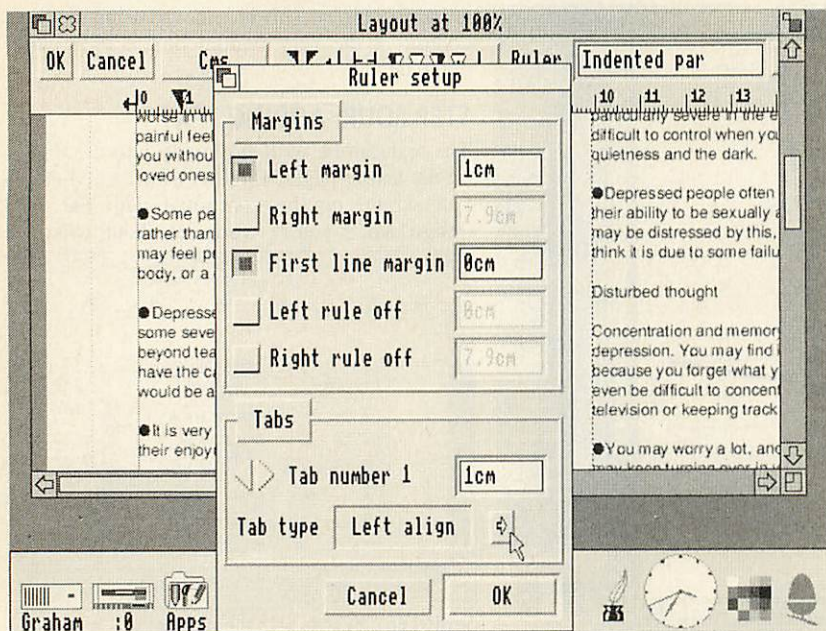
The text can be flowed into the pre-prepared layout by selecting the first of the main text frames and dragging in the text file icon. Or, if you've used *Impression* itself to wordprocess the text, simply highlight it in one document, copy it with **Ctrl-C**, then click into the frame you want and paste it in with **Ctrl-V**.



Text is flowed into the frames on the page

Once text is written, use the spelling checker. It's worthwhile building up a personal list of words that you often use that aren't already in the *Impression* dictionary. First, go to the Dictionary dialogue using **Ctrl-F8**, and use the Create option on the menu to make a UserDict. Beware – the menu only pops up if you aren't pointing at one of the buttons in the dialogue.

When the spelling checker comes across an unrecognised word, there are three options. If it's a mistake, correct it by highlighting the correct spelling then clicking on Replace. If you rarely use the word, or it's something specific to this document – not a real word but part of a postcode for example – then click on Ignore. This adds it to a temporary list of 'words' that's



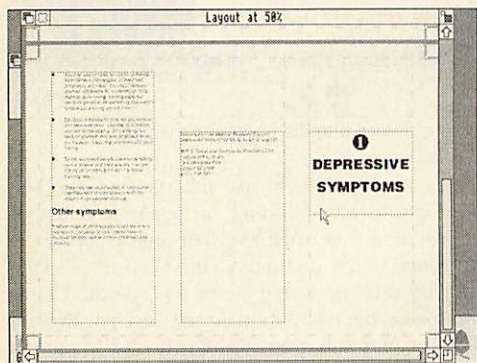
Setting up a ruler called indented par to produce the indented paragraphs

kept to refer to only until you switch off or reset your computer.

Finally, if it's a word you want to add to your user dictionary, then click on Add word. They could be common names, specifically scientific terms, or a range of rarely-used words missing from the main dictionary, or even foreign language text. If you check the spelling of most things you type, you'll soon add a few hundred words to the user dictionary, which will end up covering almost everything.

Make sure you quit *Impression* in an orderly way, as only then are the user and exception dictionaries saved automatically to disk. There is a Save option in the Dictionary menu, but you need never use it.

The other useful dictionary is for hyphenation exceptions. You can view this list by choosing Exceptions in the Dictionary menu. To add a word, type it into the white box, using numbers to indicate the preferred hyphenation (3 is the best place to split the word, 1 is the worst place). Then click on Add word.



Producing the cover for a fold-up leaflet

STEP FIVE: TWEAKS

This particular text needs only a little more work. There are a number of bullet points, where the text needs indenting. This can be done by making a new ruler called Indented par. Shift-Ctrl-N leads to the Ruler setup dialogue. Type the ruler name into the white box, then use the Ruler

HINTS AND TIPS

- You can set up an Auto save process via the Preferences option on the Document sub-menu. This will save the file for you every few minutes. But it does have a drawback: it tends to save just after you've made a hideous mistake – overwriting the good version. So always set the Prompt option.
- New documents are based on a Default document stored inside the *Impression* application: if you create a new Default, then all your new documents will follow the new style. To find Default, Shift-double click on *Impression* and open the Auto folder.
- Importing text from Edit can sometimes be confusing. Edit uses newline characters to format the text into lines, whereas *Impression* uses them to separate paragraphs. In Edit, use the Find dialogue (f4) to search for \n\n (remember to turn Magic characters on), and replace them by \x0D. Replace to the end of the file (you can just press E). Now replace \n with a single space, and finally use the CR<->LF option. Your text is now ready to import straight into *Impression*.
- Effects are used very sparingly in this document – only the bullet points and the number on the cover are set into Selwyn using an effect. The bold and italic text uses styles, not effects, because these are easier to change at a later stage. It's simple to change all the Homerton.oblique to Trinity.italic if it's in a style, but altering many Text font effects would be time-consuming.

menu to allow you to enter exact ruler dimensions: to get the effect shown, set the left indent at 1cm, first line indent at 0cm and set a left align tab at 1cm.

The leaflet also needs a style set up for the sub-headings in the text. These should obviously be larger than the main text, but not too overpowering. It's important for the look of the leaflet to keep the line spacing at some multiple of the main text – if Basestyle is set on 12pt, then make the sub-heads on 24pt. This ensures that the text in adjacent columns lines up across the page.

Next, you can adjust the exact length of the columns, so that the text falls neatly. Rather than moving the bottom of each column frame, work out where you want the next column to start, place the cursor there and press Ctrl-G (or Force to next on the Frame sub-menu).

STEP SIX: THE COVER

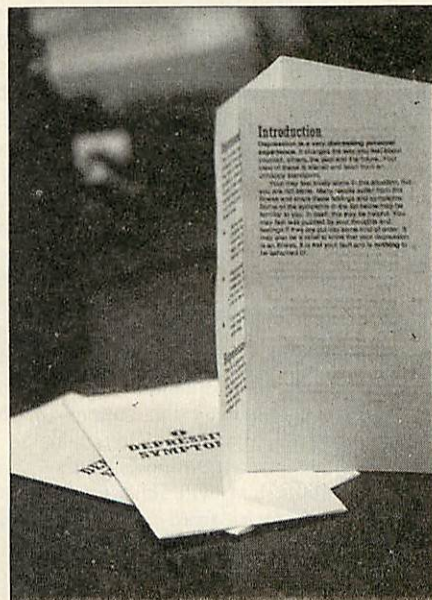
Finally, it needs a cover. This can be arranged on the sixth frame. It's done this way so that the text can flow automatically from frames on the first page (which forms the inside of the leaflet when folded) to the second (which forms the back and the cover). Text cannot flow backwards from page 2 to page 1 in *Impression*.

The top of the cover frame is lower to put the cover text a little above the centre of the page – this gives a nice, balanced look to the leaflet. The text on the back cover (the middle frame on page two) can be aligned with this by lowering the top of the frame to match – just as Snap to guides makes following the guide frames easy, make sure Snap to frames is ticked on the Frame sub-menu to do this bit. If you find Snap to Frames missing from your copy of *Impression*, then an upgrade to a later version is available from Computer Concepts.

Next month, we'll take a look at adding a tear-off to the leaflet, and sending it to a bureau for really professional printing.

THE FINAL RESULT

And this is how the final document looked – or perhaps it's one that we prepared earlier!



TopicArt

A new form of clip art comprising of single discs containing approximately 50 hand drawn high quality draw format clip art images, each on a single subject. Site and area licences are available, please ring for details.

£8

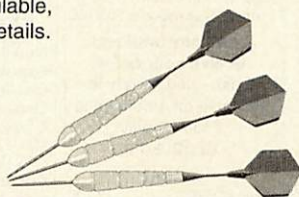
+VAT
per disc.



TopicArt3
Costumes



TopicArt6 - Road Signs



TopicArt7 - Sports Equipment

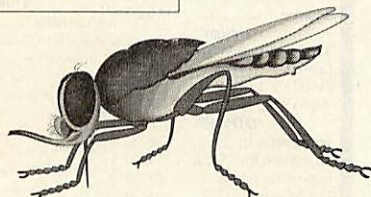
7 TopicArt subjects are available now. Please specify when ordering.

Buy 4
TopicArt
discs get
one free

Subjects available now;
1 - General
2 - Transport
3 - Costumes
4 - Entertainment
5 - Bugs 2 Slugs
6 - Road Signs
7 - Sports Equip



TopicArt4
Entertainment



TopicArt5 - Bugs to Slugs

SCSI Floptical Disk Drives

Yes its true!, each 3.5" floptical diskette can hold 20Mb of programs and data etc. Floptical disc drives which are SCSI devices are a wonderful complement to existing SCSI hard disc users or as an alternative to a hard disc solution. Transfer rates are typically 65ms/100k/sec and like standard floppies are completely transportable. Flopticals are also a good media for backing up hard discs. All units are externally housed in an attractive case with power supply and includes one floptical floppy.



= 20Mb

A3000/A5000/Archimedes Floptical (without SCSI card) £399

A3000/A5000/Archimedes Floptical (with SCSI card) £499

A5000 Internal Floptical kit (with SCSI card) £359

Floptical floppies (20Mb) £20

Tiler

£10+VAT

A printing utility which allows you to print Draw or Sprite files at any size using any printer. The user simply loads the required draw or sprite file into Tiler specifying the size of poster required, using a preset paper size, ie. A2, A0 etc, or as a percentage of the original size or in physical dimensions, ie millimetres. The document will then be increased or decreased in size automatically and printed over several pages with crop marks provided on each page to assist cutting/overlapping.



MegaUtils £10+VAT

A set of genuinely useful RISCOS utilities!
!AddrBook An easy to use address book.
!Diary A place to store your birthdays etc.
!CleanUp A hot key util for redrawing windows.
!Disable Prevents you from deleting any file.
!DOSForm A multi-tasking DOS 720k formatter.
!FileMon Displays information about any file.
!LineClock A desktop clock.
!MegaUtils provides a window organiser, key short-cuts to open/close file windows, set copy and wipe options, set filetypes, quick loading of basic programs, caret flasher, selection of mouse speed, automatic opening of applications, mouse hider, caret grabbing.
!QuickMode Select modes with ease.
!QuickRun An application loader.
!ScrGrab Allows you to save the screen display to a Sprite.

Hardware, Software & Books (All prices exclude VAT)

A5000 (with free 2Mb RAM u/g)

A5000 2MHD £1499
4Mb RAM, 40Mb HD, MultiScan Mon
A5000 2MHDLC £1529
LEARNING CURVE SYSTEM with
Multi Scan Monitor, Acorn DTP, 1st
Word+, Genesis+, PC Emulator,
Pacmania, etc.
A5000 2MHDLC £1759
LEARNING CRV PRINTER SYSTEM
Including Acorn JP-150 Ink Jet Printer

A3000 (with free 2Mb RAM u/g)

BBC A3000 £599
As above with Monitor £789
BBC A3000 LC £639
LEARNING CURVE with 1st Word+,
Genesis+, PC Emulator, Pacmania,
introductory video etc.
As above with Monitor £829
BBC A3000 LCP £1089
LEARNING CRV PRINTER SYSTEM
Including Acorn JP-150 Ink Jet Printer
BBC A3000 £679
SPECIAL ACCESS
As above with Monitor £869

Archimedes

Archimedes A410/1 £729
With 1Mb RAM & Floppy Drive
A540 ARM3, 8MB RAM £2495
0% Finance (Inc VAT)
A5000LC System £1799
£179 Deposit plus 12 monthly
instalments of £135
A5000LC Printer Sys £2075
£215 Deposit plus 12 monthly
instalments of £155
A3000LC System £999
£99 Deposit plus 12 monthly
instalments of £75
A3000LC Printer Sys £1275
£135 Deposit plus 12 monthly
instalments of £95

RAM Upgrades

A3000
Up to 2Mb RAM £45
Up to 4Mb RAM £129
A5000
Up to 4Mb RAM £95
A400
1Mb RAM £39
2Mb RAM £75
3Mb RAM £105
A540
4Mb RAM £399
Hard Discs
The following are complete hard disc
systems comprising of interface, hard
disc, mounting bracket, cables,
utilities disc & guide.
IDE Archimedes Internal
40Mb 17ms £229
80Mb 17ms Cache £315
125Mb 18ms Cache £399
180Mb 18ms Cache £449
330Mb 12ms Cache £799
520Mb 12ms Cache £999
IDE A5000 Internal
120Mb 9ms Cache (Replacem't) £250
100Mb 18ms Cache (2nd Drive) £250
IDE A3000 External
40Mb 17ms £315
80Mb 17ms Cache £399
125Mb 18ms Cache £485
180Mb 18ms Cache £535
IDE A3000 Internal Hard Cards
20Mb £199
SCSI Archimedes Internal
50Mb 17ms Cache £339
105Mb 18ms Cache £429
180Mb 18ms Cache £599
330Mb 12ms Cache £899
520Mb 12ms Cache £1049
SCSI A3000 External (with int card)
50Mb 17ms Cache £379
105Mb 18ms Cache £509
180Mb 18ms Cache £699
(Add £30 for Archimedes External)

Monitors
Acorn Colour £199
Philips CM8833 II £199
Taxan 770+LR £279
Taxan 795A £139
Taxan Viking II £749

Printers

Canon BJ-10e £209
Canon BJ-300 £359
Canon BJ-330 £409
Citizen Swift 24e £235
HP DeskJet 500 £329
HP DeskJet 500C £549
Star LC24-200 Mono (Col +£40) £199
Laser Direct (Qume) £799
Laser Direct HiRes4 £999
Laser Direct HiRes8 £1319

Printer Consumables

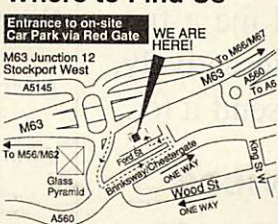
BJ-10 Ink Cartridge £17
BJ-300 Ink Cartridge £13
DeskJet 500 Ink Cartridge £15
DeskJet 500C Colour Cartridge £27
LBP-4 Toner £60
Swift 24 Mono Ribbon £5
Swift 24 Colour Ribbon £15

Hardware Upgrades

ARM3 £185
FaxPack (CC) £289
Joystick Interface £25
Joystick for above £10
Midi Expansion Card £65
Scanlight Junior £129
Vision Digitiser Archi £49
Vision Digitiser A3000 Int £49/Ext £62

Terms UK residents add 17.5%
VAT to all prices except books.
Carriage is free (except books &
paper) on mainland UK, elsewhere at
cost. Prices and manufacturers
specifications subject to change
without notification. Goods offered
subject to being unsold and/or
available. Goods not offered on trial
basis. Restocking fee on non-
defective returns.

Where to Find Us



Books (No VAT)

Acorn Education Directory £4.95
Dabs Archi Assembly Lang £14.95
Dabs Archi First Steps £9.95
Dabs Archi Operating System £14.95
A3000 Technical Guide £29.95
A540/A5000 Tech Guide (ea) £65.00
Acorn DTP Adv User Guide £14.95
Basic V: A Dabhand Guide £9.95
BBC Basic Guide (Acorn) £19.95
RISCOS PRM's £79.00
RISCOS Style Guide £9.95
1st Word+ Manual (Acorn) £10.00
Acorn DTP Manual (Acorn) £10.00
AASM Manual (Acorn) £25.00
ANSI C v4 Manual (Acorn) £25.00

Software (Applications)

3D Construction Kit (Domark) £38
Armada (Clares) £59
Art Works (CC) £22
Arc DFS (Dabs) £22
ArcTerm 7 (Serial Port) £62
Atelier (Minerva) £69
Compression (CC) £42
Desktop C v4 (Acorn) £189
Equisor (CC) £39
Eureka (Longman) £109
Font FX (DataStore) £9
Graphbox Pro (Minerva) £109
Illusionist (Clares) £76
Impression II (CC) £125
Impression Junior (CC) £75
Impression Bus Supp (CC) £39
Impression Borders Disc £12
Investigator v2 (Serial Port) £22
Notate (Longman) £54
PC Emulator (Acorn) £95
Pin Point Junior (Longman) £24
Pipe Dream 4 (Colton) £179
Poster (4Mation) £75
Presenter Gtl (Ling) £33
PrimeArt (Minerva) £69
Pro Artisan (Clares) £75
Render Bender v2 (Clares) £99
Revelation II (Logotron) £110
Rhaphody v2 (Clares) £45
Schema (Clares) £96
ShapeFX (Data Store) £9
ShowPage (CC) £130
SmArt (4Mation) £54
Snippet (4Mation) £26
Squirrel Database (Dig Ser) £129
Superior Speech! £15
Tiller (Clares) £120
Tracker (Serial Port) £37
TypeStudio (Beebug) £43
Worra CAD (Oak) £83

Software (Games)

Aggressor (Atomic) £18
Air Supremacy (Superior) £19
Apocalypse (4D) £17
ARCTiculate (4D) £17
Ballarena (Eterna) £14
Bambule (Arxe) £19
Blitz (Arxe) £17
Bobby Blockhead (Atomic) £18
Boogie Buggy (4D) £17
Break 147 & Superpool (4D) £17
Bubble Fair (Eterna) £14
Bug Hunt, MoonDash (Min) £13
Bug Hunt in Space (Minerva) £13
Cartoon Line (Eterna) £19
Cataclysm (4D) £17
Chess 3D (Micro Power) £14
Chocks Away 2 (4D) £17
Chocks Away Extra Miss(4D) £14
Chocks 2 Compendium (4D) £27
Chuck Rock (Krisalis) £19
Dreadnoughts (Turcan) £27
Elite (Hybrid) £33
Enter the Realm (4D) £17
E-Type Compendium (4D) £17
Flight Sim Toolkit (Simis) £35
Fun School 2/3/4 (ea. <5, 5-7, >7) £18
Grievous Bodily 'ARM (4D) £17
Holed Out Compendium (4D) £17
Iron Lord (Cygnus) £14
James Pond (Krisalis) £19
Legend of the Lost Temple £19
Lemmings (Krisalis) £19
Loopz (AudioGenic) £19
Mad Prof Mariarty (Krisalis) £15
Mag Scrolls Collection 1 £26
Manchester Uld Europe (Krisalis) £19
Master Break (Superior) £15
MicroDrive 3D Golf, USA Cse ea. £15
MIG 29 Super Fulcrum (Domark) £32
Nevryon (4D) £15
Pandora's Box (4D) £17
Pesky Muskrats (Coin-Age) £20
PipeMania (Ent. Int.) £17
Powerband (4D) £17
Real McCoy 1/2 each (4D) £20
Saloon Cars (4D) £17
Superior Golf, Ext Cses each £14
Starch (Dabs Press) £12
SWIV (Krisalis) £19
Top Banana (HEX) £19
Tower of Babel (Cygnus) £18
Twin World (Cygnus) £14
Waterloo (Turcan) £22
Wonderland (Virgin) £25
X-Fire (4D) £17
Zelanites (Micro Power) £18
4D prices held whilst stocks last!

Desktop Projects Ltd

Tel: 061-474 0778

Authorised Acorn Dealer (We operate the Acorn Teachers Scheme & 0% Finance Scheme)

Unit 2A, Heapriding Business Park, Ford St, Stockport, Cheshire. SK3 0BT



Registered
Squirrel Dealer

JUN92

BBC/IBM file transfer BeebDOS 3 £46

IBM PC software to transfer files between the BBC and IBM PC by reading and writing BBC disks on the IBM 360k, 720k, 1.2mb or 1.44mb drive. Many BBC diskette formats are supported including: ADFS (all except 800kE), Watford, Solidisk, Opus, and UDM, DDFS. In addition single density DFS and Torch CPN are supported on some IBM computers. Please ask for details or try our **BeebDOS Test Pack £6** to find if your IBM PC/ compatible will support the BBC diskette format you require.

BBC to IBM BASIC BeebPC £40

BeebPC translates programs from BBC BASIC to IBM BASIC. BeebPC is used by many program authors and it greatly reduces the time required to convert a BBC BASIC program for use on the IBM PC.

BeebDOS 3 + BeebPC (BASIC) £71 BBC/IBM Disk transfer £12 per disk

Send us your BBC or IBM disk and tell us the disk type you want us to copy it to. Our transfer charge is £12 for each disk you send us, with 50% discount for ten or more disks.

IBM PC/PS2 Teletext £110.00

Turn your IBM or compatible (including PS2's and laptop/notebook) computer into a sophisticated teletext receiver for only £110.00 including software and teletext adaptor.

If you already have a Ground Control, Morley, or Solidisk teletext adaptor then use one of our kits below to connect and use it on any IBM PC/compatible.

Morley to PC kit £55

Ground Control or Solidisk to PC kit £35

The teletext adaptors can be connected to the parallel (printer) or serial port of the IBM computer. Please specify the type of data lead you require (serial or parallel). Postage and packing is included (within U.K.), please add VAT.

For more information or to order contact:



**MICROBOSS LTD 3 HADLEIGH RD FRINTON
ESSEX CO13 9HG TEL (0255) 671095/(0255) 674989**



SEN LAC Computing Limited

Accounts

Accounts Manager351.32
Home Accounts.....35.00

Art/Graphics

Artworks.....148.00
Chameleon.....23.95
GraphBox Pro.....115.00
Illusionist.....85.00
Revelation 2.....128.75
smArt.....54.00
smArt Filer.....38.00
!Tracer.....57.00

Clip Art

Ethnic Borders.....9.95
Graph. Fact., Vols 1-5.....26.95
Mid. Graph. Draw 1or 2.....32.00
Micro Studio Packs (from)20.00
Southern Printers Art 1.....6.00

Communications

ArcComm 2.....55.00
ArcTerm 7.....70.00
FaxPack.....312.00

Databases

Flexifile.....133.00
Multistore v2.....255.00
Pinpoint.....99.00
Squirrel.....150.00

Design

3D Construction Kit.....45.00
Einstein.....135.00
Euclid v2.....58.50
Worra CAD.....98.00

DTP/WP

Impression 2.....150.00
Impression Bus. Supp.....52.00
Impression Junior.....81.00
Desktop Folio.....94.00
EasiWriter.....145.00
Pendown Outline Fonts.....19.95
Poster.....87.00
Protext.....132.00

Education

Fun School 3 (0-5).....21.00
Fun School 3 (5-7).....21.00
Fun School 3 (7+).....21.00

Hypermedia

Genesis 2.....130.00
Maggie.....56.00

Music

Notate.....59.00
Rhapsody 2.....55.00
Score Draw.....55.00
VoxBox.....55.00
MIDI/Sampler (Econet).....75.00

Peripherals

ScanLight Junior.....145.00
ScanLight Junior 256.....225.00
ScanLight Professional.....950.00
with SCSI interface.....1050.00

Don't pay until you receive your order!

Cash-on-Delivery is available on orders up to £350 for only £2.50 extra.

Printers

Epson LQ570.....290.00
LaserDirect HiRes 4.....1050.00
HP Deskjet 500.....355.00
HP D'jet 500C+driver.....585.00
Swift-24e colour+driver.....305.00

Spreadsheets

Eureka!.....128.75
Pipedream 3.....138.00
Pipedream 4.....199.00
Schema.....113.00

Utilities

Articulate.....19.00
MultiFS.....34.00
Compression.....48.00
Equasor.....48.00
ShowPage.....138.00
FontFX.....9.75
ShapeFX.....9.75
Glimpse.....9.00
Investigator 2.2.....25.00
Speech!.....16.50

Consumables

TDK Discs 3 1/2" (box 10)
DS/DD, 800k.....11.50
DS/HD, 1.6M (A5000).....15.00
Virgin Discs 3 1/2" (box 10)
DS/DD, 800k.....8.50
DS/HD, 1.6M (A5000).....12.50

Games

Aggressor.....17.80
Air Supremacy.....19.45
Bambuzzle.....17.50
Bobby Blockhead.....17.50

All prices include VAT, post & packing

Break 147 & Superpool.....29.95
Cataclysm.....21.50
Chocks Away v2.....21.50
Chuck Rock.....22.95
E-Type Compendium.....21.50
Elite.....37.95
Enter the Realm.....21.50
Grievous Bodily 'Arm.....21.50
Holed Out Compendium.....21.50
Interdictor 2.....29.95
James Pond.....22.95
Lemmings.....22.95
Legend' Lost Temple.....19.50
Loopz.....21.50
Magnetic Scrolls Colln.: Fish, Corruption, Gld of Thvs.....28.95
Man. Utd. Europe.....22.95
Master Break.....16.50
Pandora's Box.....21.50
Provocator.....16.95
Saloon Cars.....21.50
SWIV.....22.95
The Real McCoy 1 or 2.....24.95
The Real McCoy 3.....29.95
The Thing of Darkness.....21.95
Top Banana.....21.25
Tower of Babel.....19.75
Wonderland.....27.99
X-Fire.....21.50

Cheques/postal orders should be made payable to

SEN LAC Computing Ltd. (AU0692)

P.O. Box 304

BRIGHTON, BN2 2TT

Don't forget to specify A3000/Archimedes/A5000!

Please send a S.A.E for our current price list.

VAT Reg. No. 508 7594 16

Company Registration No. 2277309

Desktop Publishing on Acorn Systems

- What are the component parts of a DTP system?
- How can I do DTP using Acorn computer systems?
- How good are they compared with Mac's and PC's?
- How much will it all cost?
- Where can I go for expert advice?

All these questions and more are answered in the booklet, "Desktop Publishing on Acorn Systems", published by Archive magazine, price 75p (inc p&p).

To get one copy, *free of charge*, write to N.C.S. stating "I saw your advertisement in Acorn User Magazine. Please send me a free copy of your DTP booklet". Alternatively, just fill in the coupon opposite and send it to...

Norwich Computer Services

96a Vauxhall Street, Norwich NR2 2SD.

Phone 0603-766592, Fax 0603-764011

Please send me a free copy of "Desktop Publishing on Acorn Systems".

Name.....

Address.....

.....

.....

.....

AU

Postcode.....

(See review in Feb. 87 and Aug. '89)

£20.95
£25.95

PAYROLL

£59.95

BOOKKEEPING

(see review in March '89 *Acorn User*)

- | | | |
|------------------------------|---|-------------------|
| 1) CASHBOOK | Double entry bookkeeping for home or club use. All data kept in memory. Three character analysis code enables you to know where the money comes from and where it goes. 48 transactions per A4 page. Analysis summary up to 30 categories. | £14.95 |
| 2) CASHBOOK D As 1) | + random access giving 2000 items. CASH/BANK or VAT/BANK headings. Password control. String or numeric searches. For schools, clubs & non credit businesses | £23.95 |
| 3) ACCOUNT As 2) | + Credit facility and statements. For small businesses working with credit | £35.95 |
| 4) ACCOUNT-PLUS As 3) | + Invoicing, Orders, Quotations etc. Full sorting of data by 5 options. Automated statements, mailing labels. Multiple automatic nominal ledgers. For independent schools and VAT businesses who wish to cut the effort. | £59.95 |
| 5) TAXMAN | This new program which has been under development for three years allows you to enter all your transactions and to printout end of year results with balance sheet and even calculate tax due. The Inland Revenue love it and so do we. Results can be taken from our other accounting programs and entered into TAXMAN making a superb combination | £59.95 |
| 6) Micro-Trader | is a full accountancy package with features right through to final balance sheet. Stock Control at £75.00 extra. For shops/firms, accountants wanting full accounting facilities. Payroll can be integrated | £235.00
£88.13 |

MAILING

218 addresses in memory or up to 1875 on random access disc. Multiple selected and repeat labels, mail merge, full sorts. Ideal for subscription lists, promotions, any kind of mailing.	£14.95
	£35.95

Ask for detailed brochure for more software and other items.
Demo discs available for £2.50 each, Micro-Trader £25. Prices include VAT add 81p p/p
PLEASE NOTE OUR MOVE & CHANGE OF ADDRESS FROM CORNWALL

Micro-Aid

(FAX AVAILABLE)

Kildonan Courtyard, Barrhill, S. Ayrshire
Scotland. KA26 0PS. Tel: 0465 82288



The Datafile

The Public Domain and Shareware Library
Demo / Catalogue VII

- | | | |
|-------------------|---|----------------------------|
| !Hangfire | The ultimate in screen burn savers. This has 16 selectable affects and is programmable. | Edouard Poor. |
| !IconClock | Turns your iconbar's Arc logo into an analogue clock. Neat. | Shareware. |
| !Set Type | The easy way to set file types. From the iconbar. | Emmet Spier. |
| !STModMake | Plays tracker modules and will split them into their sound modules and song files. | Emmet Spier. |
| !Tut-Anch | A graphics treat. | Gregor Knoell. |
| !Zap | A wicked sideways shoot em' up game. | Jonathon Whelan. |
| Col | A very good STRacker module. | |
| FerrariF40 | One sprite file and one draw file of the car. | Nick Van der Walle. |
| NG-Draw | Twenty draw files. From a toilet to a battery. | Nigel Gent. |

For the fastest service use the Datafile.

All orders returned by 1st class post on the SAME day.

This quality disc contains 990k of archived PD & Shareware. Plus the very comprehensive Datafile catalogue which now contains 540k of information on over 450 discs. Including the amount of software in k per disc, version numbers and descriptions of every program. Many are archived and contain well over 800k to give you the customer superior value.

All our discs are £1.25 each with one free bonus disc for every ten discs that you order.

Become a registered Datafile user. For £5 per year we will send you, bi-monthly, the next six Demo / Cat discs. You will also get two free discs for every ten discs you order during the period of your registration.

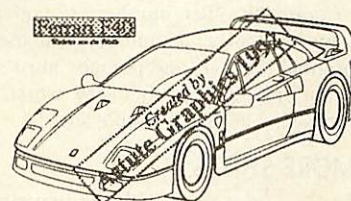
PD Voucher: Send £13 and receive the above disc with a voucher for a further 12 discs. This saves you £3 on our normal prices and makes a very good gift.

For the above disc send either a £1 coin (taped to a piece of card) or a cheque to:



The Datafile

**22 Duxford Drive
Aldergrove
Co. Antrim
BT29 4BG**



AVP

From Britain's largest Supplier of
Educational Software

2 Comprehensive Guides to over 2500 Educational Programs for the BBC, Archimedes, A3000, A5000, RM Nimbus and IBM PC

All in Stock for Immediate Delivery

- 1 For 5-11 age group
2 11-Adult

For Your Free Copy Contact
AVP School Hill Centre
Chepstow Gwent NP6 5PH

Telephone	0291	625439
Fax	0291	629671

THE
BIG
BLACK
CAT
ALOGUE

Last month I left you with a little puzzle – how can you multiply by 3600 (the number of seconds in an hour) using just three simple Arm instructions? There are, in fact, quite a number of solutions to this and I arrived at mine through the following steps:

$$3600 = 16 \times 225$$

$$3600 = 16 \times (256 - 31)$$

$$3600 = 16 \times (256 - (32 - 1))$$

At each stage I tried to get the numbers I was using to be powers of two. Working from the innermost brackets outwards, this can be translated into Arm instructions as follows:

```
RSB R1,R0,R0,LSL #5
```

```
RSB R0,R1,R0,LSL #8
```

```
MOV R0,R0,LSL #4
```

The program *Arm1* shows this in action – try changing the initial `MOV R0,#2` to verify the method. Of course, you could really make use of the multiply instruction:

```
MOV R1,#3600
```

```
MUL R0,R1,R0
```

But there are disadvantages: you cannot always directly load the value you want to multiply by into a register; you always need an extra register to hold the other number (if you are cunning, you can 'build' a multiply that uses only your original register) and perhaps most significantly, a multiply can, at the very worst, be over 16 times slower than a simple `MOV`!

MORE SHIFTS

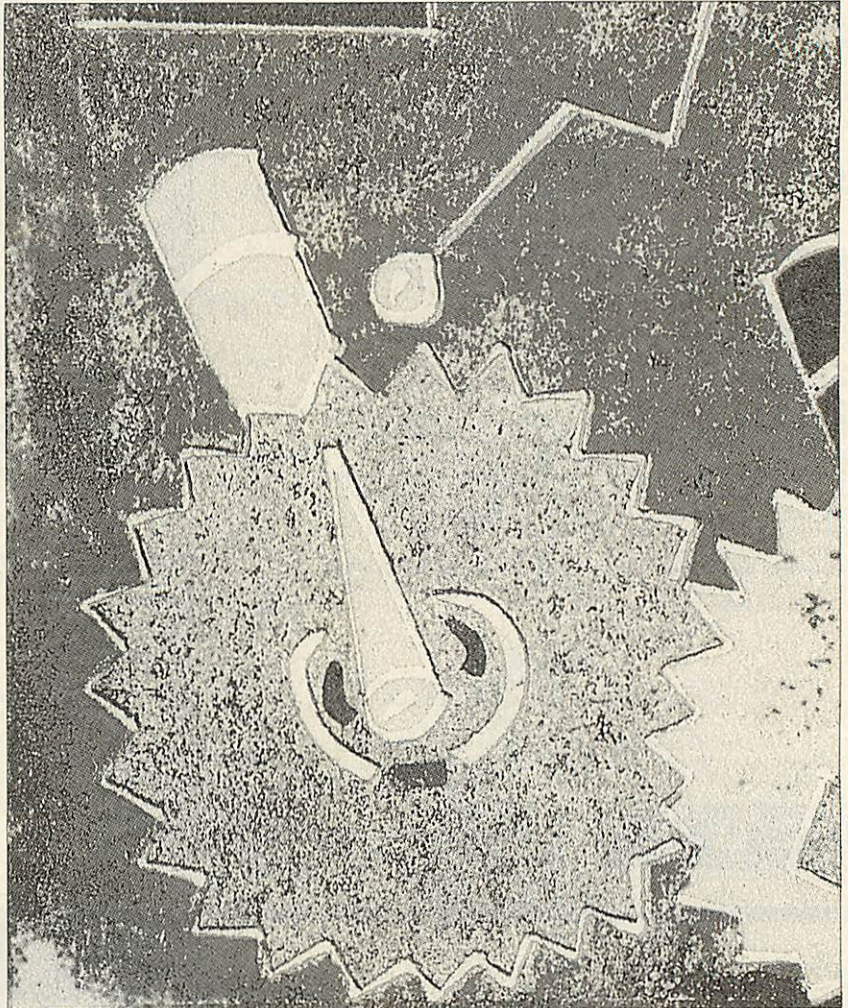
So far I have dealt with the two simplest shifts, Logical Shift Left (LSL) and Logical Shift Right (LSR). These shift the bits within registers *logically* – without any further considerations. If you think back to my second article (in the March issue) where I introduced negative numbers and described the twos complement notation, you should remember that negative numbers have their top bit (bit 31 on the Arm) set. This adds an extra little twist to shifting numbers.

For example, say we were working with an eight bit processor, as it is fewer digits to write down, the number 12 would be represented by the binary number 11110100, shifting the number right one place (trying to divide it by 2) would give 01111010 or 122 in decimal. My calculator says that $-12 \div 2$ is -6, so we seem to have a little discrepancy!

In fact, -6 in binary is 1111010, and as you'd expect the top bit is set. What we could do is have a right shift especially for negative numbers, that places 1's in the top bit rather than 0's. This wouldn't be useful for positive numbers though and would tend to lead to messy code which would have to check the sign of a number before shifting it.

Instead what we have is an Arithmetic Shift Right or ASR for short. This works for both positive and negative numbers and moves all the bits right in the register but preserves the status of the top bit, thus keeping the sign of the number intact.

There also exists an Arithmetic Shift Left (or ASL). However this performs exactly the same function is the logical shift. If you think about it, a left shift of a positive number will always double it (assuming no significant bits are lost out of the top of the register), also a left shift of



ASSEMBLY LINE

DAVE LAWRENCE

gets shifty with
this month's
assembly advice

most 2s complement numbers will also double them. For example, if we double -12 (11110100) we get -24 (11101000) which could be performed with a logical shift.

If you imagine the number -12 in a 32-bit environment, it would have an awful lot of 1's at its 'top end', meaning that it could be doubled many times with logical shifts before an incorrect result was generated. Such a result will, in fact, only be produced in a situation where the negative number can not be represented. For

example, back in eight bits, the number -127 (10000001) doubled would give -254. Shifting the bits left would lose the top bit and shift a zero in (giving us 00000010) thus losing the numbers 'negative-ness' and giving us the incorrect answer of 2.

But, the number -254 cannot be represented using eight-bit twos complement anyway! Hence there is no need for an arithmetic shift left. The Arm assembler will still recognise the three letters ASL, but it will merely assemble the code as if you this was an LSL. So, if these two instructions perform the same function, what is the point of having them both?

Well, when you are writing a piece of code, it is sometimes helpful to maintain some degree of coherence. If you are treating the registers as numbers (both negative and positive), it would make sense to use ASLs and ASRs. If you are viewing the registers as mere collections of bits, then LSLs and LSRs might make your code easier to understand. One word of caution; be careful when right shifting, as ASR and LSR perform different functions – make sure you use the right one!

SIGN EXTENSION

Before moving on to the last sort of shifting, here's a practical use of shifts. Say you were working with a large quantity of smallish numbers, in fact, small enough for them to fit into eight bits and you are making use of this fact to save a large amount of memory by storing them in single (eight-bit) bytes rather than full (32-bit) words. The problem comes when you try and perform any arithmetic on these numbers.

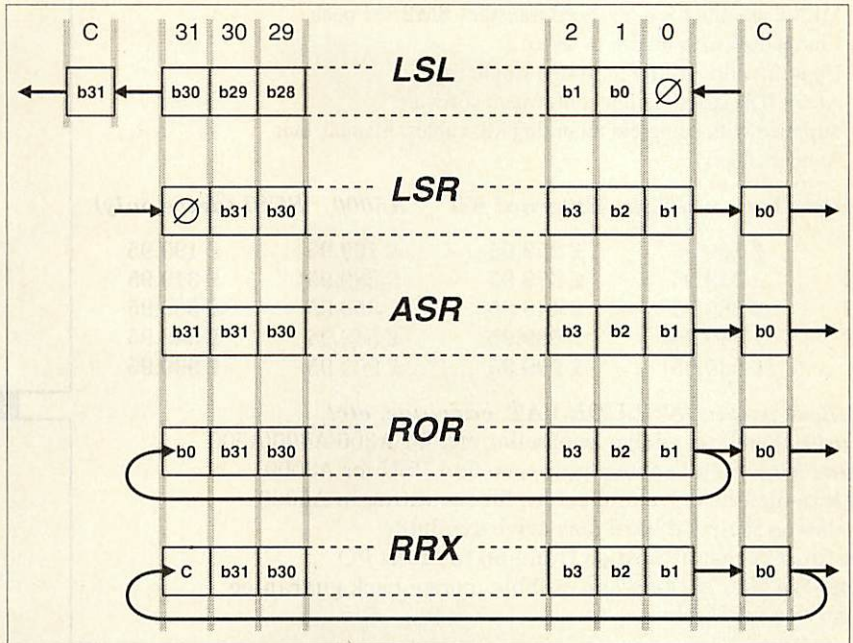
As I have outlined in the past, negative numbers are represented slightly differently according to how many bits you have available, thus -12 in an 8-bit, 2s complement environment is 11110100, but on the Arm there would need to be an extra 24 1's to the left of this! The above number will simply be interpreted as an eight-bit positive number (244, to be precise). All positive numbers will be acceptable since those top 24 bits will be 0's. What we need is some way of 'copying' the sign bit of our eight-bit number all the way up to the top of the 32-bit Arm register. This can be performed with two Arm instructions:

```
MOV R0,R0,LSL #24
MOV R0,R0,ASR #24
```

The first instruction moves the eight-bit number into the top eight bits of the register (the sign bit is therefore shifted up into bit 31 of R0 - its sign bit). The second instruction moves them back down to the bottom again, but because the shift is arithmetic rather than logical, the sign bit is preserved. This process is called 'sign extending' a number – we are extending the sign of the eight-bit number from one bit to 25 bits. The program *Arm2* illustrates this in action.

ROTATES

The final type of shift is called a *rotate*. I don't want to dwell too long on rotates for the moment as they will only come in useful when I deal with registers as collections of bits, later in the series. I'll just give you a brief overview of what they do. The instruction that we use for rotating is called ROR and it stands for ROTate Right. It



Five shifts in action: LSL, LSR, ASR, ROR and RRX

YELLOW PAGES

Both of the programs mentioned in this article, *Arm1* and *Arm2* can be found in yellow pages. Alternatively, you can load the programs from the monthly subscribers' disc.

behaves in a very similar way to the LSR instruction that we have met already. The difference being that the bit that 'falls out of' bit 0, in addition to being placed in the carry flag (refer to last month's article) is also copied into the top bit of the register instead of the zero that gets put there by LSR.

Therefore no information is lost – all the bits of the original are kept, they're just in a different order! There is no mathematical significance behind a rotate, after all, you're dividing a number by two and changing its sign according to whether it was odd or even!

There are couple of things to note, firstly there is no explicit rotate left instruction; this can be performed by rotating right by 32-leftshift. For example, a left rotate by one place is identical to a right rotate of 31. Finally, a rotate right of zero, would effectively do nothing at all, so instead of 'wasting' this instruction, a special case has been defined, this is called RRX or Rotate Right with eXtend.

This behaves like an ordinary right rotate except that the bit that gets placed in the top bit of the register comes from the carry flag rather than bit 0. (Bit 0 is copied into the carry flag as with a plain rotate right.) This comes in handy when dealing with numbers larger than 32 bits, which I will come to later in the series. Rotates can sometimes be used in code to swap two halves of a register. For instance, the instruction: `MOV R0, R0, ROR #16` will swap the top and bottom 16 bits of R0.

To gain a clearer idea of how the registers can be used take a look at the figure above. This shows graphically, the effects of all the five shifts available. All except RRX can be of any size, which can either be an immediate constant or a register.

Next month, we will be moving on to some more involved programming techniques. I'm going to introduce branches and condition codes. With these we will be able to build some Basic-like structures and finally have some useful example programs!

Innovative upgrades for Acorn computers

High spec IDE hard discs

- MEMC podule for high speed transfer - 8MB/sec peak
- Compatible with all drives tested
- Up to four drives driven from a single card
- Acorn IDE specification conformant software
- Supplied with complete mounting kit, cables, manual, etc.
- Available now.

Capacity	Internal Kit	External Kit	A5000	SCSI (drive only)
44MB	£ 199.95	£ 259.95	£ 169.95	£ 199.95
100MB	£ 319.95	£ 379.95	£ 289.95	£ 319.95
130MB	£ 389.95	£ 449.95	£ 359.95	£ 389.95
210MB	£ 579.95	£ 639.95	£ 549.95	£ 549.95
425MB	£ 939.95	£ 999.95	£ 909.95	£ 999.95

All of these prices **INCLUDE VAT, carriage, etc!**

Internal kits include drive, controller etc. for A300/A400/A500

External kits include above plus case and PSU for A3000

A5000 kits include drive and cables for mounting in A5000

Trade-ins on your old hard disc drive available

Full refund of cost of card on trade-up to Multi I/O

Unsure? We offer a 14-day no quibble money-back guarantee
Fitting service available

Logitech FotoMan Camera

- Still image capture system with hand-held camera
- Stores 32 pictures at 376x284 in 256 levels of grey
- Fully portable with built-in flash
- Serial data transfer does not require a podule slot
- Telephoto, wide angle lenses, filters, etc. available
- RISC OS compliant driver software
- Sample disc of photos available
- Available now. £ 649.95 inc VAT

Floating-point Accelerator

- Dramatic increase in speed of maths on Arcs and A3000s
- Compatible with all machines, including ARM 3s.
- IEEE 80-bit floating-point as per Acorn spec
- Single width podule fits in any slot
- Compatible with all applications tested
- Typical performance increases attained:
- Simple ops 2-5x speed of ARM 3, 5-10x speed of ARM 2
- Trig functions 15x speed of ARM 3, 50x speed of ARM 2
- Available now. £ 174.95 inc VAT

Bits'n'bobs

- 3.5" floppy discs: 10 for £ 5.95, 50 for £ 20.00, 100 for £ 37.00
- 20, 40 and 50MB ST506 hard drives for A400/1: call and ask
- A3000 RAM upgrade 1-4MB for £ 169.95 inc VAT
- A310 RAM upgrade 1-4MB for £ 229.95 inc VAT
- A410/1 RAM upgrades at £ 34.95 per MB inc VAT
- SCSI hard drives and interface cards
- Ex-demo 15"-21" monitor and GT-4000 scanner available
- A3000 serial upgrade £ 17.49 inc VAT
- Secondhand A5000 multiscan monitors available
- Requirement not listed? We can probably help.

Aleph-One

80386SX Card

- Speeds P.C. software by 10-20 times
- Runs in a window under RISC OS
- Fully P.C. compatible
- Available now. £ 579.95 inc VAT.

ARM 3 Upgrade

- Speeds all software by 2-5 times
- Extra speed for DTP, graphics, etc.
- The original ARM 3 upgrade
- Available now. £ 229.95 inc VAT

Colour Scanners

- 400 or 600 d.p.i. Epson colour units
- A4 flatbed scanning
- High speed parallel interface
- Reviewed in AU Jan 1992
- Available now
- 400 d.p.i. £ 1395.00 inc VAT
- 600 d.p.i. £ 1595.00 inc VAT

Multiscan Monitors

- All scan from 15-38kHz for compatibility
- No problems with games etc. not working
- Resolutions to 1024x600 on 15"+ models
- Auto-sizing on 15"+ models
- Dot pitch 0.28mm, 0.31mm on 15"+ models
- Available now.
- 14" £ 349.95 inc VAT
- 15" £ 569.95 inc VAT
- 17" £ 799.95 inc VAT
- 21" £ 1229.95 inc VAT
- VIDC enh. £ 28.95 inc VAT

A540 4MB RAM Cards

- Upgrade your A540 to 8, 12 or 16MB
- Fully compatible
- Available now.
- 1 card (extra 4MB) £ 319.95 inc VAT
- 2 cards (extra 8MB) £ 604.95 inc VAT
- 3 cards (extra 12MB) £ 859.95 inc VAT

A5000 RAM Cards

- Upgrade your A5000 from 2MB to 4MB
- Easy fitting: no need to remove disc drives
- Fully guaranteed
- Available now. £ 109.95 inc VAT

!JPEG

- JPEG photographic image compression
- 15-fold typical compression with no quality loss
- Up to 100-fold compression available
- 4 sample discs of images included
- Available now
- Full version £ 89.95 inc VAT
- Decompress only version £ 24.95 inc VAT

D.T. Software

FREEPOST, CAMBRIDGE CB3 7BR

Tel / fax: (0223) 841099

VAT & carriage included in prices above.
Package deals available

Dealer enquiries welcome.
E & OE.

*INFO

COMPATIBILITY KEY

B	BBC B compatible
B+	BBC B+ compatible
M	Master compatible
C	Master Compact compatible
E	Electron compatible
A	Archimedes compatible
A3000	BBC A3000 compatible

PRIZE £50

MEGATURMITE

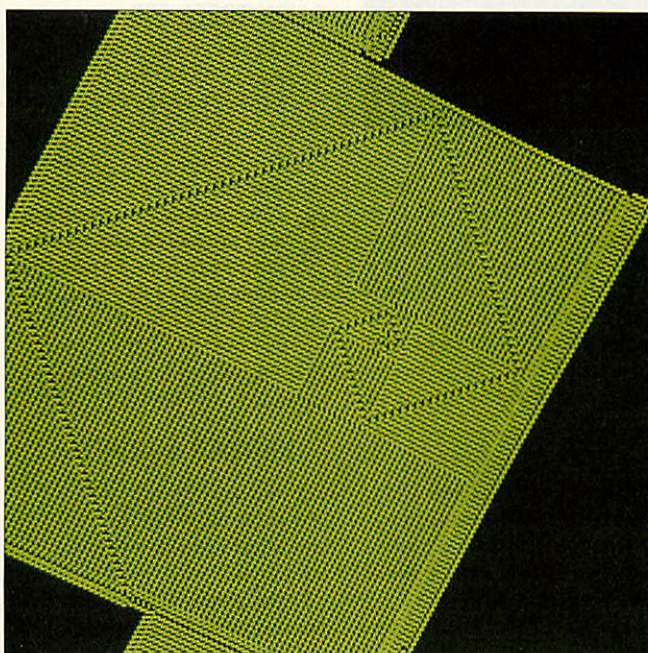
B **B** **M** **C** **E** **A** **A3000** Michael Rozdoba of Bedlington has produced a fascinating graphical version of the famous Turing machine. *Termite32* runs on any 32-bit machine and there is also an eight-bit version, *Termite8*. Simply enter and run the listing and enter a number from one to six. Michael explains what the program does:

"In the 1930s, mathematician and logician Alan Turing proposed an abstract elementary computer capable of carrying out any computation which can be formally stated—in short, a general purpose computer. Yet the device, a Universal Turing machine, was extremely simple.

"To visualise it, imagine a small black box device which sits on top of a very long paper tape. The machine is able to shunt the tape left or right, and to write and read symbols on the part of the tape that lies directly beneath it. These symbols could be different shaped and coloured blocks – it doesn't really matter. Also the device has memory, allowing it to remember an internal property called the machine's *state*. It is convenient to label the different states A, B, C and so on.

"The machine's program consists of a two dimensional array, where the rows are indexed by the various internal states and the columns by the different symbols. Each entry in the array contains three pieces of information: a

DAVE ACTON and DAVE LAWRENCE
deliver their monthly mix of bits and pieces for your eight and 32-bit machines



Some turmites are tidy creatures...

*INFO COMPATIBILITY TABLE

LISTING	NAME	BBC B	MASTER	ELECTRON	ARC
Info 1	Termite32				*
Info 2	Termite8	*	*	*	
Info 3	Lines				*
Info 4	GiantECF				*
Info 5	AlienTree				*
Info 6	Wierdo				*
Info 7(a)	Graph+				*
Info 8(b)	Squash5				*
Info 9	CompDemo				*
Info 10	CDown	*	*	*	*

NOTES (a) Additions to Decembers Graph application. The full working version is on this months subscribers disc. (b) Risc OS 3 only.

symbol, a state and a direction (left, right, or stop).

"Initially, the machine starts in state A. It then processes the symbols in the following manner. Reading the symbol beneath it, it uses this, together with its current state, to recall from its program the corresponding stored symbol, state and direction. The machine

then adopts this new state as its current value, replaces the symbol it has just read with the new symbol and then moves the tape in the direction indicated. This process then repeats, either indefinitely or until the stop instruction is found. In the latter case, the final contents of the tape make up the program's output.

"The purpose of this is to allow the theoretical study of logical processes and computability. It turns out that this device is capable of calculating any computable function.

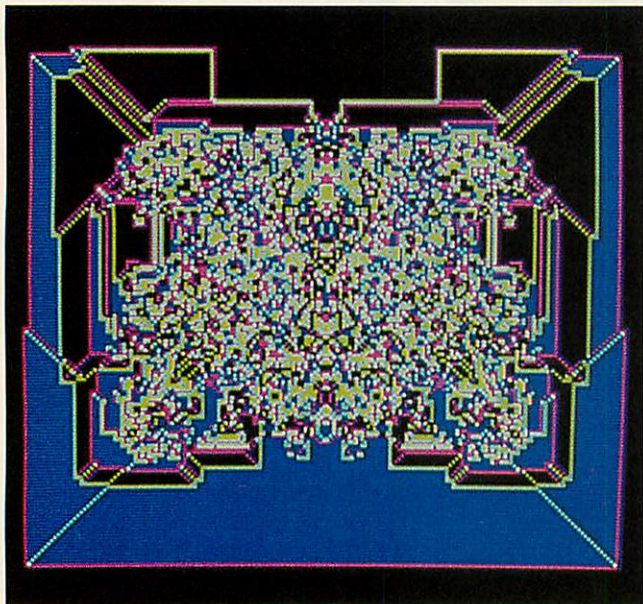
"More recently Greg Turk (at the University of North Carolina) experimented with extending this idea from a one-dimensional tape to a two-dimensional grid. Instead of thinking of the tape moving through a stationary machine, imagine the machine moving over the grid like a turtle in Logo. He calls this a Turmite (see the September '89 issue of *Scientific American* for more details). The Turmite's program works in the same way as for the Turing Machine; the only slight difference being that directions in which to move are specified as a rotation through 0, 90, 180, or 270 degrees followed by a move forward. There is no stop instruction."

Turmites are no more powerful than Turing Machines – they are equivalent. However, as the turmite lives in a 2D world, the calculation that the turmite performs can be displayed on screen, giving graphical patterns which evolve with time.

In Michael's program the grid corresponds to the matrix of pixels making up the screen. Each symbol is a single coloured pixel and there are eight valid symbols. Wraparound is used, so that if the turmite moves off one side of the screen, it reappears on the other. The turmite starts from the centre of a black screen in state A.

Six 'programs' for the turmite are included in the listing – select one at the start. To stop the turmite at any time, press ESCAPE. SHIFT+ESCAPE will terminate the program.

You can also quite easily add your own 'programs'. You can have up to eight states and eight colours in one program, although this can be increased, if needed. Each program is



... some just aren't domesticated

preceded by a number (-1, -2 and so on). Following this is a list of instruction pairs. Each pair corresponds to the action taken upon finding a particular colour in a particular state.

Each instruction consists of five pieces of data. These are: the state to which the instruction applies (A-H); the colour to which the instruction applies (bla, red, gre, etc); the colour to which the current pixel is changed (bla, red, gre etc); a turn (l=left, r=right, f=forward, b=back); the new state of the turmite (A-H).

For example, imagine the turmite is over a green pixel and in state B. The instruction for (green,B) is looked up. This might tell it to change the pixel to blue, turn left 90 degrees and become state A. This instruction would be listed as: DATA B,gre,blu,l,A. One of the colours used must be black, as that is the initial colour of the display.

Finally, you could try starting the turmite on a screen made up of random turmite colours, rather than on a solid black display. The results are nearly always unexpected and have to be seen to be believed! If you come across any interesting or unusual turmite programs, then please send them in.

Michael's program is officially called *Megatermite* since it manages to process over 170,000 symbols per second on an Arm2. Arm3 users might well like to switch the cache off to avoid missing

some of the graphical effects! The predecessor ran at only one-eighth of the speed, checking the keyboard with a SWI call after each symbol replacement. *Termite32* only checks every 1024 steps and the amazing increase in performance is a good reminder of

the high overheads of the system calls.

EIGHT-BIT TURMITES

As is our policy in ***INFO**, wherever possible we like to give eight-bit users versions of 32-bit submissions. *Termite8* is the result of much honing of machine code and is a respectably fast eight-bit turmite running in mode 2. The program works in a similar way to *Termite32* and the programs are stored in the same format.

ALIEN TREES £30

We've another set of programs from regular **Jan Vibe**. The first, *Lines*, follows on from Jan's earlier procedures to produce smooth colour scales in 256 colours modes. Jan's new procedure uses dithering to produce a speckled transition from one shade to another. This is made possible by the use of ECF patterns, first introduced on Masters and extended on the Arc. *Lines*

plots tubular lines that start and end with randomly selected colours and the so-called giant colour pattern is used to produce the dithered, in-between stages. This pattern actually consists of the four individual ECF patterns, lined up side by side.

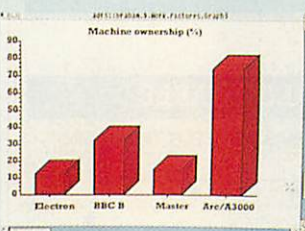
If you have not used ECFs before it is worth describing them briefly, as they are a handy way of mixing colours. Each of the four definable

ECF Pattern		1	2	3	4
Row	1	0	0	0	0
	2	1	1	1	1
	3	2	2	2	2
	4	3	3	3	3
	5	4	4	4	4
	6	5	5	5	5
	7	6	6	6	6
	8	7	7	7	7

A giant ECF pattern in a 256-colour mode as used in *Lines*

READER SURVEY

A big thank you to all those who completed the ***INFO** reader survey: it has given us an invaluable insight into what you would like to see in these pages.



The first chart shows some general details revealed by the survey. Some 74% of readers now own 32-bit Acorn machines, although 32.7% have Beebs. Many of you, 30.8% to be precise, own both eight-bit and 32-bit machines, whereas 22.1% only have eight-bit equipment and 43.3% only 32-bit. As you know, it is our policy in ***INFO**, while recognising the general trend towards 32-bit, to provide wherever possible eight-bit versions of programs. Looking back over recent ***INFO**, from October '91 to March '92 we carried 30 items suitable for eight-bit users, versus 43 for 32-bit users.

And, although most new submissions are 32-bit, we will be continuing to provide eight-bit conversions.

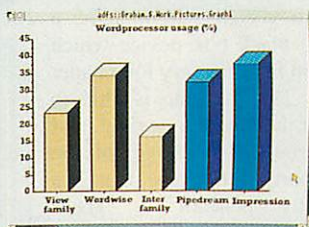
On the peripheral front, just about everyone has a dot-matrix printer with the next popular choice being laser printers. Multi-sync monitors are now pretty common and given that only 32-bit users are involved, the figure becomes 32.5%. Midi equipment is owned by 7.7% and 4.8% have Hybrid music hardware.

Over a third of eight-bit users have sideways Ram (very useful for us to know—an extra 16k often comes in handy) and 61% of 32-bit users have extra Ram. Another unexpectedly high result is the number of Arc owners with Arm3s—now nearly 20%.

Of our readership 61% consider themselves to be competent Basic

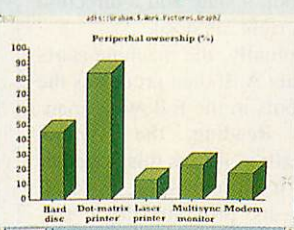
programmers and 20.2% competent at machine-code. This isn't too surprising since the column is intended to provide all sorts of programming advice!

A slender majority (51%) prefer ***INFO** to its predecessors, with 42.3% disagreeing and 6.7% of don't knows. However, 60.6%



would like to see more of ***INFO** in general and 66.3% say we cater for them in general. We hope to increase this proportion by the next survey. The best way to ensure we print what you want is to send in your own submissions!

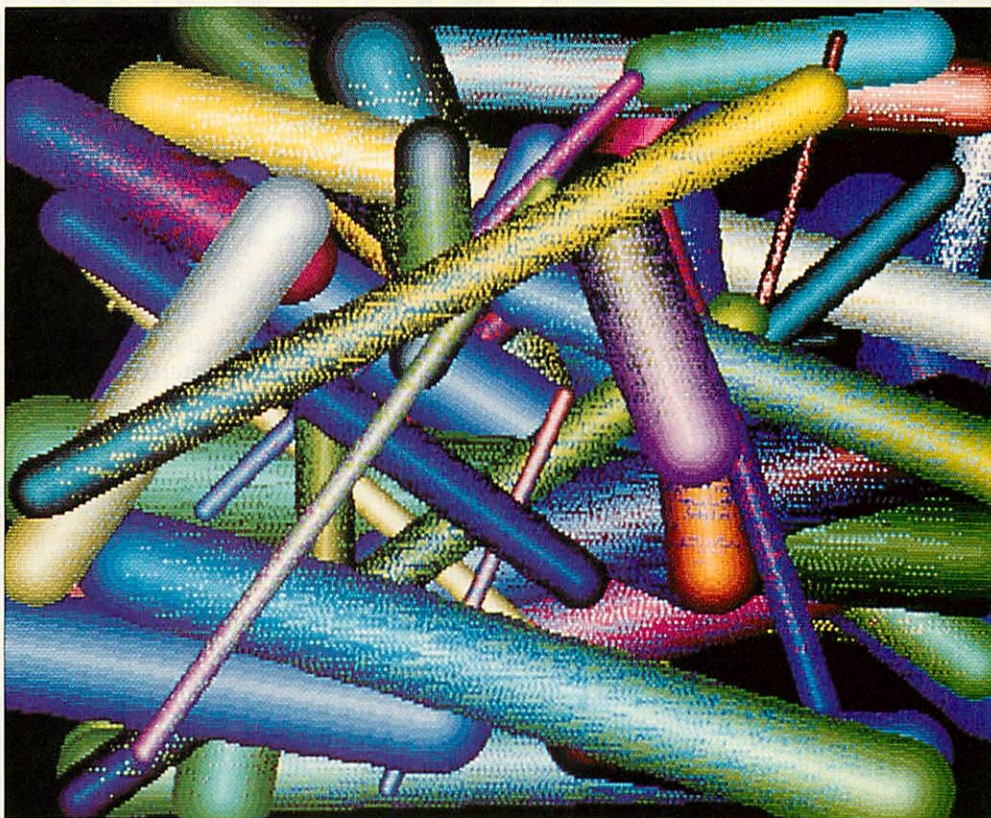
Incidentally the charts shown here were produced using one of BAU's own Graph application. It was written by Mike Curnow and appeared in BAU December '91 with enhancements published in this ***INFO** and a fully working



ECFs consists of eight bytes of data, rather like a user-defined character. In a two-colour mode, each row consists of eight pixels, so an eight by eight pattern is used to fill shapes. Once defined (using `VDU 23,1+pattern number`) they may be selected with `GCOL 16*(pattern number)` and all subsequent fills (as with `CIRCLE FILL` etc) will use the appropriate ECF. In four-colour modes, each row only defines four pixels and in 16-colour modes only two pixels. Of course, in 256-colour modes (as *Lines* uses) each ECF only represents a column of eight pixels, only one pixel wide.

This is where the Giant pattern becomes useful. The command `GCOL 80` causes the four ECFs to be used side-by-side. In two-colour modes, this provides a fill pattern of 32 by eight pixels and the short demonstration *GiantECF* illustrates this. In 256-colour modes, a modest four by eight block of pixels can be defined (see our diagram on the previous page) and this is what Jan uses. An array `pt%` holds giant ECF definitions for various stages along the line. At one end, all pixels are clear; at the other all are set. Circles are plotted to form the line using the appropriate giant ECF as read from `pt%` and the pixels are regularly mixed up to keep the effect random.

AlienTree is an unusual and artistic example of the technique shown in *Lines*. A tree is plotted (in the traditional recursive manner) but each branch and sub-branch is made up of coloured line segments of the type used in *Lines*. Each sub-branch takes the end colour of its parent as its start



Lines does it all with dithering

colour and then changes to a random colour along its length. Finally, *Weirdo* is a strange offering we got from Jan a while ago and never got round to including. Someone nicknamed it *Madonna*, but I can't image why. You'll find a couple more of Jan's offerings on the June subscribers' disc.

DODGY TROLLEY

We've received a handful of letters from people who have had problems with my automated shopping list program, *Trolley*. One particular letter came from Alex Carroll, who even supplied me with a sample file that seemed to be

causing problems. There is, in fact, a minor bug in the program that will only come to light after using the program for a number of weeks.

We seem to have got confused over the size of the `num()` and `date()` arrays. These hold the dates of purchases and the number of items bought and are used to predict when you will run out of items. If you change all occurrences of the variable `dates` to `dates-1` in `DEF PROC` calculate except for the first 'IF `dates=0` ENDPROC' and the `i=dates-1` you should find that this will cure the 'subscript out of range' errors.

GRAPH PLUS £20

Here's a neat addition to Mike Curnow's graph plotting application from last December's issue. It comes from David Waters of Amersham. If you recall, the original graphs were described by a simple text file. David's additions allow two new commands to be used that let you highlight individual points with symbols. The update also allows linear least-squares.

Graph+ contains the lines that need to be added or changed in the original *RunImage* as it appeared in

December's yellow pages. As with all updates, please take care with line numbers. The full adjusted listing is also included in yellow pages.

Figure three on the opposite page is a simple graph showing off the new features and the text source for the graph. The new commands supported are used thus: `line,n` where `n` is 0 for no line (useful for just displaying the individual points), 1 for straight line segments (like the original program produced) and 2 for the least-squares fit (as shown in the example).

To provide highlighting symbols use: `symbol,s` where `s` is the symbol to be shown at each listed point: 0=none, 1=open triangle, 2=open square, 3=open circle, 4=filled triangle, 5=filled square and 6=filled circle. Circles are in fact 16-sided polygons to avoid the need for Bezier curves, but the results are more than satisfactory.

The new commands may be used in either order, or not at all and can follow the *newplot* command if you would like to draw several graphs using different line or point styles. A complete, updated version of *Graph* also appears on this month's disc.

£10 TIP OF THE MONTH

Here's a little cautionary tip from Peter Hanley. Many Risc OS applications make use of the *MemAlloc* module for allocating memory to the Ram disc, system sprites and so on. It provides a number of *commands to check and alter the sizes of these various 'dynamic areas'. However Peter points out that there is one very silly feature in this module, if you use a call such as:

*ScreenSize 160K Error 1 Can't claim 160K screen memory

It seems to work okay in modes which use less than 160K, but any bigger modes and the error is generated! Unfortunately there seems to be no simple way round this problem—you must either enter a suitable mode before running the application or, as Peter did, write your own version of *MemAlloc*!

Peter also points out that Risc OS 3 does in fact have a similar call built in, *ChangeDynamicArea however, this can only change the size of the system sprites, the Ram disc and the font cache.

GRAPHIC PROGRAMS TO BRING LIFE TO YOUR PICTURES

ProArtisan £105



First there was the *Artisan* and *ProArtisan* series – still the most widely used art packages in education today. They feature an intuitive icon based menu system that has proved usable by children as young as three years old. Yet they are powerful enough to be used by serious artists.

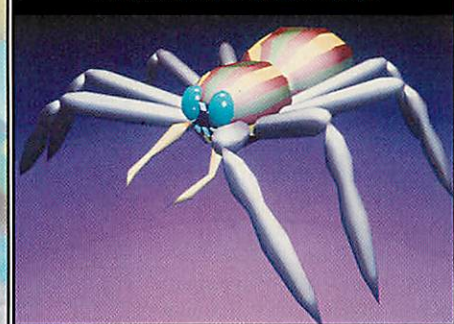
Artisan is in its second generation (*Artisan II*) and provides many useful and unique features. This is the one for younger children and anyone interested in textile design. *ProArtisan* is a more sophisticated package but retains the familiar interface of *Artisan II* – an easy upgrade path.

No, this isn't a bird eating spider and no *Illusionist* doesn't replace *ProArtisan*. *Illusionist* is a graphics package for those who

don't have the skills or inclination for free format painting.

With *Illusionist* you create a wire frame outline of your image using pre defined shapes. In addition you can define your own shapes or distort any existing shapes. This makes it very easy to generate images even if you can't draw a straight line. You can assign colours and textures to your objects. You can even give them texture maps. A texture map is any Mode 12 or 13 screen. So you can use a scanned or digitised image, a painting – literally anything!

Illusionist £99.95



Render Bender II is another top rated graphics package from Clares. Images are created in a similar way to *Illusionist* by defining objects using pre defined shapes. You then add colour, texture, lighting etc. *Render Bender* images can include glass and mirror objects as well as shadowing. *Render Bender* actually calculates the path of light from its source to the imaginary eye at the viewing position. This path takes account of any reflections and refractions.

In addition *Render Bender* can create animated sequences very easily. You can either give objects a formula to control their movement or you can give start and end positions and ask the program to 'in between' the other frames. The result is a stand alone animation that can be passed to friends or even sold.

Render Bender II £99.95



NEW REDUCED PRICE

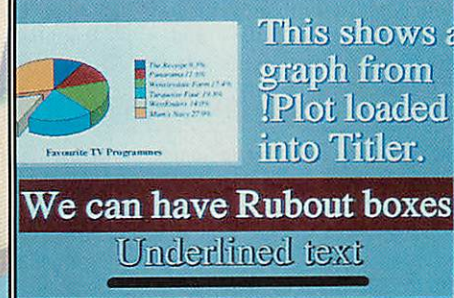
sequencing package. The *Titler* program uses outline fonts enabling you to create text screens, credits etc. You can have any colour text, background, drop shadow, underline or rub out boxes. You can also include sprites and Draw files in your screen.

The *Titler* screens can be used in the *Sequencer* program along with screens from *Artisan*, *ProArtisan*, *Illusionist* and *Render Bender*, as well as lots of other formats. You can also include *Render Bender* or *Euclid* animations, *Tracker* tunes, *Armadeus* samples or *Archimedes* samples in your sequence. *Sequencer* gives you total control over the display of the screens and provides many effects to switch from one screen to the other. As well as being a tool for video titling this package can be used purely as a presentational tool for preparing and showing lecture notes, demonstrations etc. In fact all of Clares demos are now created using *Titler* and *Sequencer*. Please request a demo disc that will illustrate the potential of these packages.

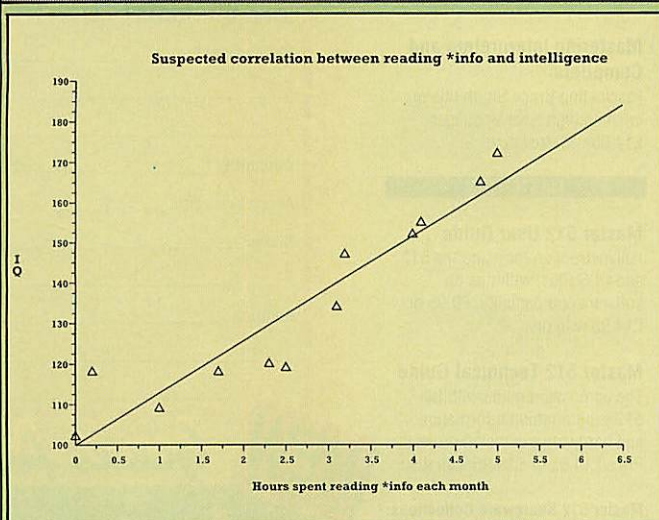
REQUEST YOUR FACT PACK TODAY!

Finally we have *Titler*. This is a video titling and

Titler £149.95



GRAPH PLUS



The graph above shows the least-squares fit of data pairs
...produced by the source data shown on the right

Title, "Suspected correlation
between reading *INFO and
intelligence"
xaxis, "Hours spent reading *INFO
each month"
yaxis, "IQ"
ymin, 100
ymax, 180
xmin, 0
xmax, 6
line, 2
symbol, 1
0, 102
0.2, 118
1, 109
1.7, 118
2.3, 120
2.5, 119
3.1, 134
3.2, 147
4, 152
4.1, 155
4.8, 165
5, 172

SQUEEZE II £20

Regular readers should remember last month's opening feature in ***INFO** – **Brian Cooke's** A5000 *SquashUtil*. He has now finished the extra code needed for saving squashed data and as promised, we can now publish the additional lines. If you turn to the yellow pages, you will find Brian's complete program.

If you have already typed in his listing from last month, you can use this as the basis for typing in the new listing. There are a couple of extra lines before line 240; the EQUUS "Save" and EQUUS 0 at 620 are new, as is the B SWI_save at line 940. The new code starts at line 3100 and finishes at the end of the program. The entire program can, of course, be found on the monthly disc.

These extra lines of code will add one new SWI call to the *SquashUtil* module, Squashed_Save. With this call, you can save a block of memory in much the same way as with OS_File 0 or *Save. The only difference is that it is compressed on the way! Four parameters should be supplied to the SWI, and a typical call might look something like: SYS "Squashed_Save", "MyFile", buffer, buffer+length, "Data"

The first parameter (R0) points to the name of the file, the next

two (R1 & R2) point to the start and end of the data in memory, finally R3 is the filetype. This can be a pointer to a textual filetype name as above, or alternatively it can be a pointer to a bit numeric filetype (such as &0000FFD) or zero.

If this is the case then the file is left untyped and the load and execution addresses are set to where the file was saved from. The actual file created will have type &FCA (*Squash*) and can be unsquashed either with Acorn's *Squash* utility supplied on the applications disc or with the Squashed_Load call also supplied by Brian's module. (For example, SYS "Squashed_Load", "MyFile", address). For more details of this and Squashed_Info, please refer to May's ***INFO**.

Given that machine code is not always that easy to follow, Brian has supplied a version of the squash routine in Basic. When run, *CompDemo* prompts for input and output filenames. The input file is loaded into memory and squashed using the same technique as the module and saved to the output file.

For your reference only, a number of variables are printed during the squashing process so you can see how well it is doing. Brian's description of how this works is shown below, followed by a summary of the SWI calls provided by the Squash module.

"Module *Squash_Compress* is called once near the start of the program, to find out how much workspace the SWI needs (this is with bit three of R0 set). The source file is then read into memory, OS_File 11 is used to create an empty, time-stamped file of type &FCA (squashed). This is then opened for output and the standard 'squash' header written to it. This consists of five 32-bit words.

"The first contains the Ascii codes for the letters SQSH and is used for identifying squashed files. This is followed by the length, load address and execution address of the original file. As with all file addresses, if the top 12 bits of the load address are set, then the load and exec address should be interpreted as a file type and time stamp. The final item in the header is a flag word. Currently these should all be set to 0, to allow for future expansion. The squashed data starts 20 bytes into the file.

"The actual squashing is performed by the REPEAT... UNTIL loop. *Squash_Compress* is the call that does all the hard work although, in general, it is a lot easier to use and explain than the corresponding decompression call. The register R0 contains flags. Bit 0 is set if there is any more data left. In this case there isn't – we are giving the call the whole source file at once. Note that

this doesn't mean that we are only going to use the compression call once to squash all the data – we set this bit to inform the call that all (remaining) data is available now – we are not secretly holding on to any!

"Bit 1 should be set if the call continues to use the contents of its internal workspace. Therefore this is clear the first time the call is used and set thereafter; R1 points to this workspace (as claimed in the set up routine); R2 and R3 describe the source data, R2 points to the next byte to be squashed and R3 says how many bytes are left to squash. Similarly R3 and R4 describe the output buffer, R3 points to it and R4 says how big it is.

"The call returns a number of things and four of these are useful to us. The register R0 is a status byte, usually 2, meaning that the operation ran out of output space. But this will become zero when all the data has been squashed. R2 and R3 are updated to point to the first unsquashed data byte and the number of unsquashed bytes respectively – these can then be passed to the call the next time round. R5 returns with the number of bytes left in the output buffer. If subtracted from the size of the buffer, this gives the number of squashed bytes 'created'. These should then be written to the output file. This loop should be repeated until a status of zero is returned. The output file is then closed."

Brian points out that for some reason the files created by Squashed_Save are not always the same length as those squashed with *Squash*. However, both sorts of file are uncompacted successfully with either Squashed_Load or *Squash*, with no data gained or lost – can anybody throw any light on this matter?

Brian says that the module is undergoing a few minor tweaks to provide some *commands to access his SWI calls. He also says he is working on a 'transparent' version that will work in much the same way as *Compression* or *ArcFS* although he freely admits that he doubts if it will ever be finished!

To round off then, here are Brian's own descriptions of – two of the most complex calls

ESSENTIAL
READING
MATERIAL
FOR THE
ACORN
ARCHIMEDES

from

DABS PRESS

THE PREMIER ACORN BOOK PUBLISHER

061-773 8632

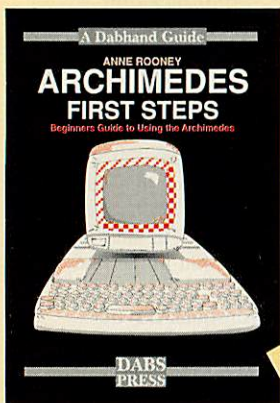
Offices: 22 Warwick St, Prestwich, Manchester M25 7HN. Tel: 061-773 8632. Fax: 061-773 8290. Proprietor: David Atherton. All prices include VAT (0% on books), and UK postage. Access/Visa accepted. Foreign add £2.50 surface, £12 air.

NEW



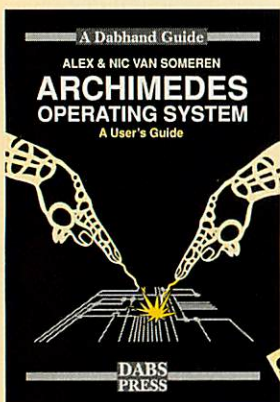
£12.95

An invaluable guide to the free software on your Archimedes, and how to get the best desktop publishing results for very little cost.



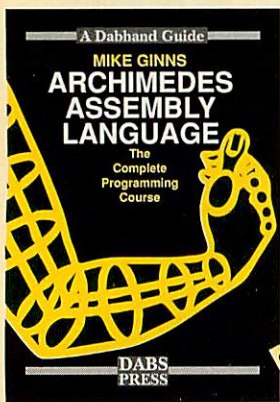
£9.95

Introductory book for the Arc, covering the basic operations and use of !Edit, !Draw, etc.



£14.95

Useful summary of OS information with detailed examples. (£21.95) with disc.



£14.95

The only tutorial and reference on ARM assembler on the market, with many RISC OS examples. (£21.95 with disc.)

BBC SOFTWARE

Hyperdriver

The ultimate printer driver ROM, with over 80 commands, a built-in NLQ character set, WYSIWIG previewing, access from View, Wordwise, Interword or BASIC. 100 page manual. For B/B+/E/M/C. Price £29.95 ROM, £24.95 disc for SRAM.

Minidriver

As HyperDriver but for Mini Office II. Includes Viewdata terminal. £24.95 ROM. SRAM version £19.95.

Mos Plus

Utility ROM for Master 128s only fixing EDIT and CLOSE#0 bugs, ADFS format, verify and backup in ROM, backup/compacting in SRAM, alarm clock and configurable startup facility and much more. Price £12.95 ROM, £7.95 SRAM.

Sidewriter

Pop-up notepad for SRAM users (any SRAM machine), works with any software. Price £7.95.

Assembler Bundle

Two Bruce Smith books on 6502 assembler with discs and Master Series update booklet. For B/B+/E/M/C/ RRP over £30, yours for £4.95!

Fingerprint

SRAM or main memory 6502 machine code monitor/disassembler/memory editor. For B/B+/E/M/C/ Price £9.95.

Conversion Kit

Ready-made 6502 assembler routines, for learning or development. Price £7.95

BBC BOOKS

View Dabhand Guide

Bruce Smith's comprehensive guide to View wordprocessor. 'For those who want a complete thorough and readable guide to View, then Bruce Smith is your man' (Beebug). £12.95 or £17.95 with disc.

Master Operating System

David Atherton's definitive reference work including the famous 'differences between all eight-bit models' section used by countless programmers to ensure compatibility across the full eight-bit range. £12.95 or £17.95 with disc.

Mini Office II Guide

Detailed tutorial by Bruce Smith and Robin Burton for the BBC/Master versions of the software. Price £9.95 or £14.95 with disc.

Mastering Interpreters and Compilers

Fascinating Bruce Smith title on creating high level languages. £14.95 with free disc.

MASTER 512

Master 512 User Guide

Full instruction for using the 512 and DOS Plus, with tips on software compatibility. £9.95 or £14.95 with disc.

Master 512 Technical Guide

The companion guide with full 512 programming information and hardware expansion projects. Price £14.95 or £19.95 with disc.

Master 512 Shareware Collections

Two collections of PC shareware, all tried and tested on the 512. Includes WP's, spreadsheets, databases, games etc. Five full 800k discs in each. Each collection normally £29.95, special offer £25 for both.

ARCHIMEDES SOFTWARE

Instigator

Utility system providing disc sector editor, memory editor, disassembler, command line archiving, and much more. Price £49.95

Arc PC Emulator Shareware

Similar to Master 512 Shareware but for the Arc PC Emulator. Two collections of five discs each. Normal Price £34.95. Now on special offer, both collections for £25.

ARCDFS

Very popular program to provide full DFS facilities on desktop or I65Host/I65Tube. Price £29.95

ARCHIMEDES/BBC BOOKS

Basic V Guide

BASIC V guide covering differences between earlier BBC BASICs and the superior version for the Archimedes. £9.95

C: A Dabhand Guide

Massive 512-page complete guide to C programming. No previous experience required. Arc & BBC sections £14.95 or £21.95 with disc.

OTHER BOOKS

Z88: A Dabhand Guide

Introduction to the Z88, by the designers of the machines own software. £14.95

Z88 Pipedream Guide

John Allen's detailed work on all aspects of Z88 PipeDream. Good explanations of printing. Price £14.95

Psion LZ OPL Guide

Ian Sinclair's guide to OPL programming on the LZ series of Organiser machines. £12.95

To Dabs Press,
FREEPOST (MR8400)
Prestwich, Manchester M25 6LZ
(Phone 061-773 8632)

Please send me:

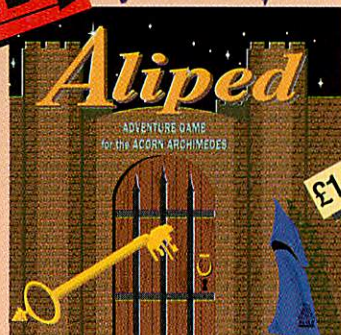
Amount £ _____ Cheque/PO enclosed.

Access/Visa No. _____

Name _____

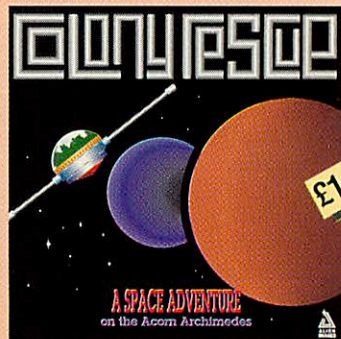
Address _____

NEW Games Action



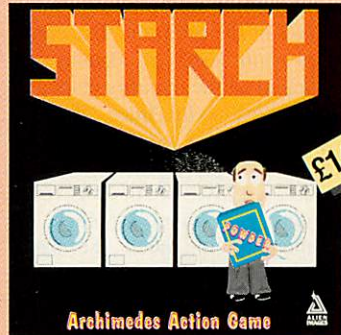
£14.95

'Aliped - wing footed like a bat is the spell that has been put on you by the evil step-mother of your fair princess Natasha'. Smooth multi-directional scrolling castle, stunning use of stereo sound, high quality graphics. Needs 1MB. RISC OS compatible.



£14.95

The date is 2143 A.D., the universe has started to contract, causing the most inner galaxies' fine balance to be upset. Their only chance is you in your humble rescue ship. Multi level game with high quality graphics. Needs 1MB. RISC OS compatible.



£14.95

'Harry and Dave manage the laundry firm, but things have been going wrong. They work all night but will they put things right?' Multi level game, high quality graphics, simple key controls for easy movement of characters. Needs 1MB. RISC OS compatible.

MORE ARC GAMES

ALERION
Classic shoot-'em-up scroller. Multi-level. RISC OS compatible. Not protected. £14.95.

ARCENDIUM
Draughts, Backgammon, Reversi and Quordle, now RISC OS compatible. £14.95.

ALIEN INVASION
Classic Space Invaders with editable invaders, waves etc. £14.95

ALL-IN BOXING
Realistic boxing game with digitised sound etc. 1 or 2 player. £14.95.

provided by Risc OS 3 Squash_Compress and its converse call, Squash-Decompress.

Squash_Compress compresses data. Both input and output can be viewed as streams, meaning that neither need to be held in memory in their entirety at any one time. The call returns if it runs out of data in either the input or output buffers.

"Register R0 contains flags: bit 0; clear to start a new operation, set to continue the operation using the existing workspace contents. This must be claimed before the call can be used 'for real': Bit 1; clear if there is no more input data, set if there is. 'More' means that the current input buffer does *not* contain the entirety of the data. Bit 2 is reserved and should be zero (as should bits 4 to 31). If bit 3 is set, then the call returns information about buffer sizes given an input size in R1.

If this is the case, the call returns with R0 containing the address of the workspace needed and R1 set to the maximum output buffer size.

"Moving on, to squash data, R1 to R5 need to be set as follows: R1 points to the workspace, R2 points to the next byte to squash, R3 contains the number of bytes of input available (data between R2 and R2+R3 is to be squashed). R4 points to the output buffer and R5 contains the number of bytes of output available. After the call, if bit 3 of R0 was clear, then it is updated to contain a status byte. A value of 0 means the entire operation has been completed and all input has been squashed: 1 means the call ran out of input data: 2 means the call ran out of space in the output buffer. R1 is preserved, but R2 to R5 are updated as follows: R2 points to the next byte to squash, R3 contains the number of unused input bytes. R4 points to the first unused byte in the output buffer and R5 contains the number of unused output buffer bytes.

"If the output buffer is definitely large enough and bits 0 and 1 of R0 are clear on input (meaning that the entire input data is available) a special algorithm is used by the call that is nearly three times faster than the 'buffered'

version. Squash-Decompress is the complement to the above call. All the parameters to the call are currently the same, except for bit 2 of R0 on input. If this is set to 1, the call assumes that all the output will fit in the buffer specified by R4 and R5 and a faster algorithm will be used. Unsquashing is about twice as fast as squashing and the fast algorithm is nearly six times faster again!

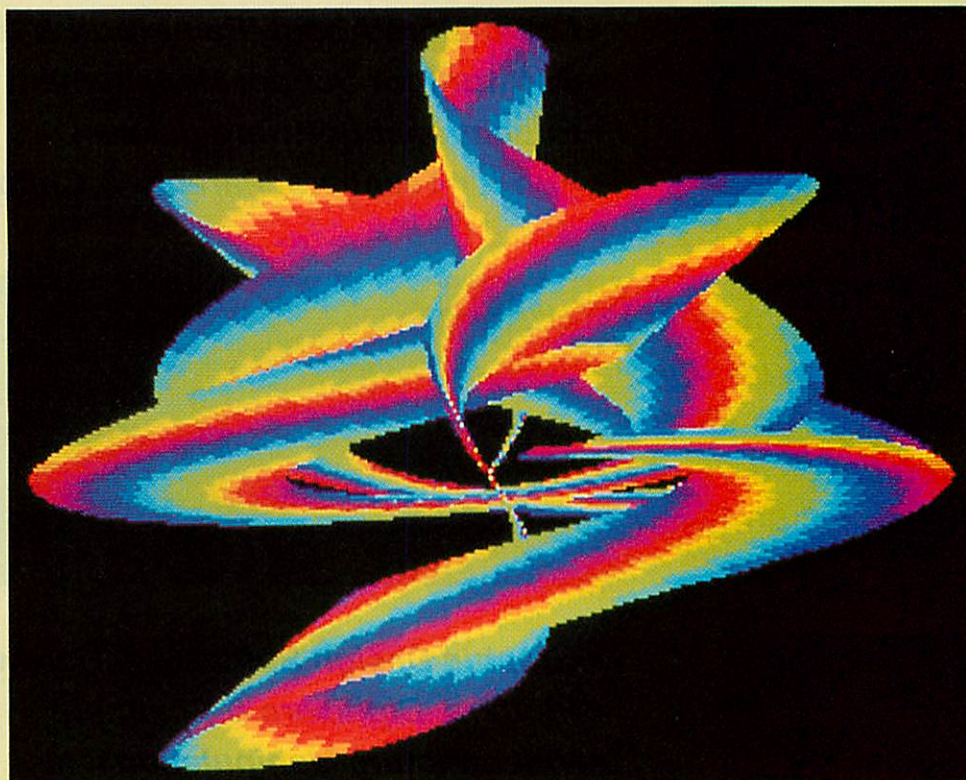
"If the call ran out of input data (status 1 returned and R3<12) then the unsquashed data must be supplied again on the next call. If you look at my demo last month, or in the code for .SWI_Load, you will notice that it sometimes copies a number of bytes from the end of the input buffer to the start before loading in some more bytes."

One final note: the current implementation of the call cannot predict how big the final data will be. This means that -1 is always returned in R1 when the SWI is called with bit 3 of R0 set.

*DISC

As always, there are two ways to get your hands on the *INFO programs. They can either be copied in from our yellow pages or loaded from the subscribers' monthly disc (see page 89 for details).

And, as usual, there are a few extras to be found on this month's disc. From Jan Vibe, StarCross and Rainbow should serve to entertain 32-bit users. For Master owners there's a short planetary demonstration from Adam Scott. And of course, you'll find the complete revised version of the Graph application.



COUNTDOWN £20

**B
B
M
C
E
A** At the time of writing this, my all-time favourite TV show, *Countdown*, has finished its latest run on Channel 4. Clearly many BAU readers are also fans and following our Arc 'numbers game' solver back in the March issue, Richard May of Bristol has sent in a Basic program that does the same job on all machines.

For those not familiar with the game, six numbers are chosen from a selection of 25, 50, 75, 100 and 1 to 10 and a random target figure must be reached by combining some or all of them with +, -, * and /.

CDown uses, in the words of its creator, "an intelligent/heuristic approach to solving the problem. Even when running on a BBC B it can often outpace the Archimedes solution."

Enter the six small numbers and the target then select a quick or full search as desired.

The nearest solution that is found will be displayed.

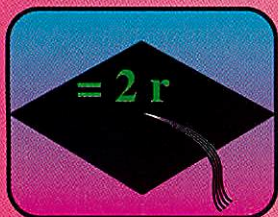
The heuristics cannot guarantee to find a solution. Indeed there may not be a solution, as was proved in the last series when Cecil (the random number generator on the programme) chose a total that was larger than the highest possible combination of the selected numbers. However, Richard's program, GOTOS and all, is an admirable demonstration of how the Beeb can tackle such a tricky problem.

*QUIT

Please send your submissions to us at: *INFO, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. All but the shortest of programs should be on disc and accompanied by a brief description of their purpose and operation. A stamped addressed envelope with your submission will ensure the return of your disc.

**Dave Lawrence
Dave Acton**

*Something
for
everyone !*



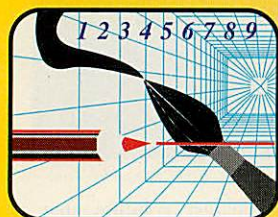
Education

- On-going Schools Projects at the Show
- Learn More About !Paint !Edit & !Draw
- Software for School Management
- Educational Software galore !
- Fun for Teachers, Parents & Children

- Word & Document Processing
- Accounting & Spreadsheet Software
- Integrated Business Packages
- Databases & Fax Emulators
- Using PC Software on your Archimedes



Business



Design

- Graphic Design Software & Hardware
- Plotters, Digitisers & Scanners
- Video Picture Manipulation
- Desk-top Publishing Software & Hardware
- Fonts - Titlers - CAD

- GAMES - GAMES - GAMES - GAMES
- Large Screen Knock-Out Competitions
- Home Accounts & Word Processing
- Simulation Software
- Music & Celebrity Guest Appearances



Leisure

ADVANCED TICKET APPLICATION

ADULT TICKETS £5.00 (€6.00 at Door)
UNDER 16 TICKETS £4.00 (€4.50 at Door)
FAMILY TICKETS £15.00 (€17.00 at Door)

Please send this application form to
SAFESELL EXHIBITIONS LTD,
MARKET HOUSE, CROSS ROAD,
TADWORTH, SURREY, KT20 5SR.

VISA & MASTERCARD HOLDERS CAN
PHONE 0737 814713
FOR TICKET ORDERS

Please rush me :

Adult Under 16 Family Tickets

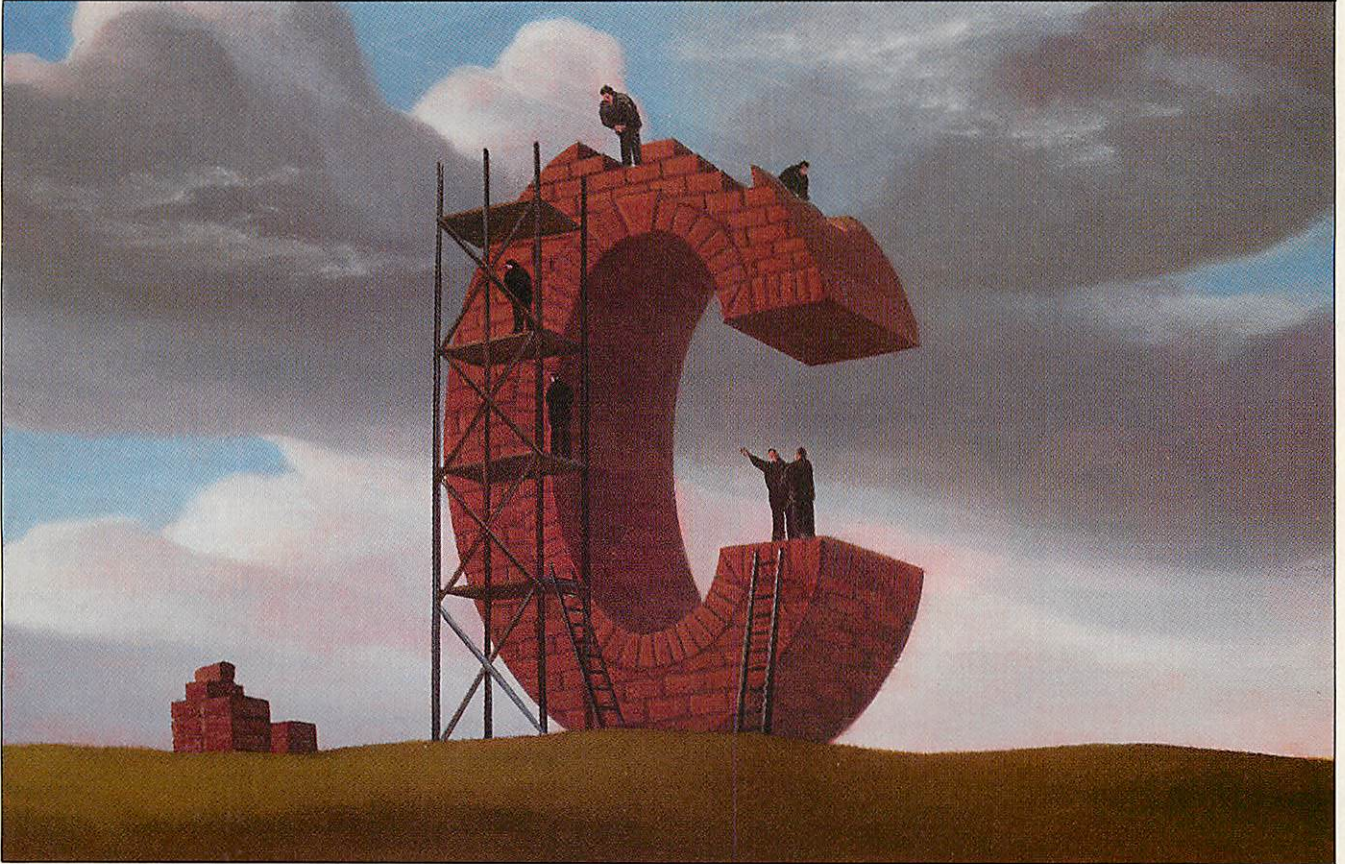
I enclose a cheque/postal order for £ made out to
SAFESELL EXHIBITIONS LTD or please debit my Mastercard
or Visa Card no.

Signature

NAME

ADDRESS

POSTCODE



C FOR YOURSELF

The idea of writing a multi-tasking Risc OS application can appear very daunting the first time you attempt it. There are so many things to consider – menus, windows, loading and saving, messages from other tasks and so on. Before you know it, your simple Basic program is 1500 lines long. And runs like a drain. So what's the alternative?

Well, Acorn recommend C as *the* development language and when it comes to writing desktop programs, C has more than one advantage over Basic. This article has two real purposes – to give non-C programmers a glimpse of what the language has to offer and to encourage those with a little more experience to try their hand at writing Risc OS applications.

Over the next two months, we will be building up just such an application. *Timely* – a diary/calendar/year planner will be the end result, a useful program in itself and also a convenient vehicle for illustrating the basic concepts of C.

BUT WHY C?

C programs run much quicker because they are compiled into machine-code. If you have something complicated to display in a window, you'll really notice the difference. But, better still, writing applications in C is actually *easier*

than in Basic. A vast library of ready-to-use procedures means that there is often a call to do exactly what you need.

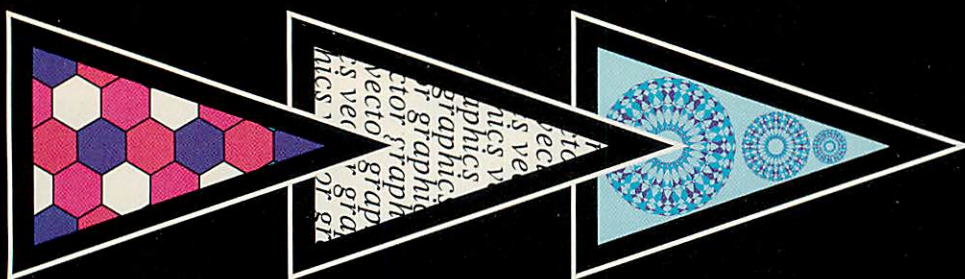
A CRASH COURSE

C programs are written as text. Many features are similar in appearance to Basic, although plentiful supplies of curly brackets are compulsory. These text files are then compiled by the C compiler, a program that is usually called *cc* and held in your library. Although the compiler produces a machine-code version of your program, you cannot use it immediately. Instead, it's stored in a directory called *o*, as a special sort of file. This contains details about your program and the compiled code itself.

Another program called the *linker*, generally called *link* in your library, takes this special file and links it with any others it might need to produce the final program. This is the version that you can run. The reason for the linker is that you can include bits of other programs in your own creations.

So, the purpose of the linker is to go away and find all the different bits that your program uses and include them as appropriate. All you need to do is tell the linker where it can find these programs and use the command *include* in your

In the first of a new series Dave Acton introduces C, the high flier of programming languages



by Jonathan Marten
the author of DrawPlus

Vector

the
RISC OS
drawing
package

Vector's wealth of features includes:

- ◆ Highly-compressed saving using a Drawfile-specific technique
- ◆ Printing of large documents over several sheets
- ◆ Saving of all lines of text as a single text file
- ◆ Modularisation of documents into 32 separate layers
- ◆ Easy drawing of lines, curves, arcs, ellipses, rectangles and polygons
- ◆ Continuation of existing paths
- ◆ A facility to define line patterns
- ◆ Scaling and rotation of objects about their corners, centres, or any point on the document
- ◆ A 256 colour selection box
- ◆ An additional unique palette for each document
- ◆ Locking of objects for safety
- ◆ Undeleting of deleted objects
- ◆ Comprehensive facilities for scaling, rotating, skewing, aligning and spacing out of objects
- ◆ A choice of rulers and grids
- ◆ Auto scrolling of windows
- ◆ Compressed Libraries for storing Draw objects and sprites
- ◆ Precise ordering of objects (not just Front and Back commands)

Special facilities include:

- ◆ Path merging, splitting and reversing
- ◆ Interpolation between objects
- ◆ Replication - objects can be repeated as many times as required without consuming memory - ideal for repeating patterns
- ◆ Radiation - any path can be radiated around a choice of centres - when combined with path merging, amazing results are possible
- ◆ Masking - any object can be filled with any other object

Extra RISC OS 3 functions:

- ◆ Automatic kerning
- ◆ Text and sprite rotation
- ◆ Conversion of text to path objects
- ◆ Dithering to show colours which are not available in the current palette

FREE DEMO DISC

Why not check it out yourself?
Send us a blank disc and ask
for a demo copy of Vector
(complete apart from the save
and print facilities).



£85 + VAT
\$NZ 330 incl GST
includes P&P and a
FREE SITE LICENCE.



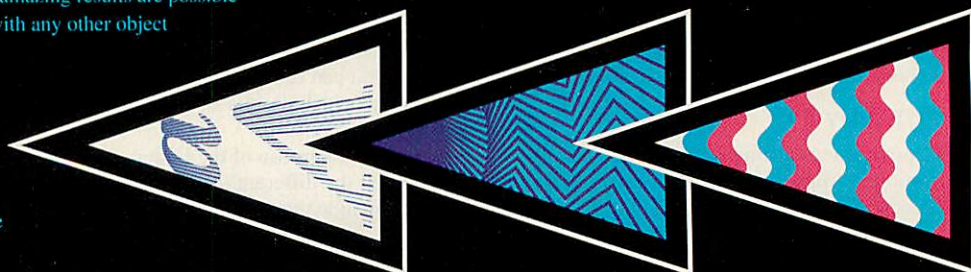
4Mation
14 Castle Park Road
Barnstaple • Devon
EX32 8PA

Tel. (0271) 25353
Fax. (0271) 22974

4Mation NZ
PO Box 12-228
Christchurch

Fax. (03) 655-055

NZ price subject to exchange rate fluctuation



text program, with some details. Thanks to this facility C programs can rely heavily on libraries.

There are standard libraries, usually held in `$.CLib` and these include mathematical functions, string functions and standard input and output routines which are common among all versions of C. You include them in your program with the directive `#include`. This command can also be used to incorporate your own libraries of routines as well as those supplied with the C compiler.

C is clever, in that any libraries you include needn't be recompiled with your program. Instead, you include a header file (found in directories called `h`) which simply lists all the pre-compiled functions and the parameters they expect. The linker then includes the necessary code in the final image.

Another program called the *make* utility is used to wrap up the whole process of compiling your C program into one neat file. You simply describe how to compile your program in a simple text file and the *make* utility takes this file and processes it intelligently. The clever thing about *make* is that it will only compile or link those components of your program that have changed. For example, you might have a program `c.myprog` which includes a library `$.userlib.c.lib`. If you only change `c.myprog` the *make* utility will realise this and won't bother recompiling `$.userlib.c.lib` as well. We'll see more of *make* in the months to come.

C FEATURES

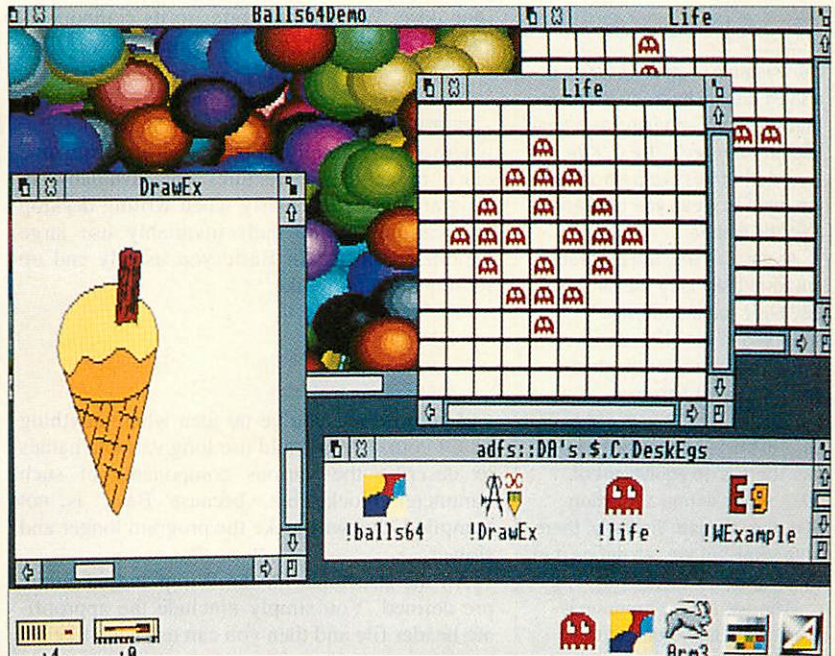
There are certain key features of the C programming language that distinguish it from others like Basic. Two of the most important ones are structures and pointers.

Let's deal with structures first. In Basic, you are limited to certain variable types, or *cases* as they are called in C. You can have integers, floating point numbers, strings and that's about it. You can build arrays of these types, but you can't define new ones. It is rather like building a housing estate with only a few fixed house designs. You can build a street of one type, as with an integer array, but you can't mix and match types.

C is more flexible. You have the standard cases `int` (integer), `float` (floating point), `char` (character) and so on, but you can also define your own cases, either as copies of the standard ones or combinations of them. Such combinations are called structures. So, returning to our housing example, not only can you create your own house designs but you can group these together however you like, so your Basic street of identical semis could be replaced by a C street of bungalows, skyscrapers and whatever else you fancy.

Sometimes new cases are used just for clarity. For example, `font` handles have their own case in Risc OS. This is defined with the statement `typedef int font;` which means that you can initialise the variables like this: `static font title;`

The variable `title` is just an integer, but because the new case is described as `font` this makes its purpose clearer. Cases don't just make programs prettier though – they are also invaluable for debugging purposes. The clearer you are about the nature of a variable, the easier it is for the



The C language is particularly good for graphics and windows as these examples show

compiler to spot mistakes when you use a variable out of context. For example, if you have an `int` variable `i` and assign it the value of a `float` variable `f` with `i=f;` the compiler will warn you that you're throwing away some precision. You must tell the compiler that you really know what you're doing by *case converting*. This means including in brackets the case you want to end up with. In this case you would use `i=(int) f;` and the compiler then lets it through.

It's when you start combining different cases, that the versatility of C becomes apparent. As an example, look at the structure of `font_desc` in the figure below. It's taken directly from a library called `FontUtils` which we'll be using when we create our application next month. It's a good example of structure because it has just about everything in it.

The first element in the structure is an array of characters called `name`. Strings only exist in C as character arrays, which is a bit of a bind when you're used to Basic, but no real hardship. In this array is stored the font name (Homer-ton.Bold.Oblique or whatever). Next is `handle` which is of type `font`. As I said earlier, this is just an integer but using `font` rather than `int` makes it more readable and it will still compile should the definition of `font` be changed.

The type `draw_fontref` is defined in the library `drawtypes.h` which provides many types for manipulating draw files. We include a variable `no` of this type in our structure, in case we wish to use the font in a *Draw* file (as indeed we will next month). Next comes an integer `id` which is sort of a user-handle to do with as you like. Then two double-precision floating point variables `xpt` and `ypt` define the font size. Finally, two more character arrays are included to contain user-supplied font sizes.

The beauty of using this structure is that a single variable can be used to refer to the whole set of mixed variables. Because the structure is defined with `typedef`, it is not a one-off affair but can be used as a case (just like `int`). So the line: `font_desc title;` defines an object, `title`, of type,

BUYER'S CHOICE

Before you can get going in C, you will need to buy a copy of the C programming language. Acorn's own version of C – also known as Norcroft C – remains the standard. Release 3 marked a great step forward in ease of desktop programming and now with release 4 things are easier still. All of my examples and the application that will follow next month are suitable for Acorn C, release 3 or later. Release 4 costs £229 plus VAT. Contact Acorn on (0223) 245200

Beebug also provide their own C compiler with libraries that are nearly identical to Acorn's. It's undergoing something of a service at the moment and a new version is expected to appear at any time now. We will of course, let you know of any changes that relate to these programs. This costs £77.39 plus VAT. Contact Beebug on (0727) 40303.

We would also recommend that you buy an introductory book on programming, such as *A Book on C* by Al Kelley and Ira Polley (ISBN 0-8060-4)

CASE STRUCTURE

```
typedef struct {
    name[48];
    font handle;
    draw_fontref no;
    int id;
    double xpt,ypt;
    char user_size[8];
    char user_height[8];
} font_desc;
```


C IN ACTION

Our example program *BasKite* is a short doodle by Andy Gibbons that originally appeared as a one-liner in February's *INFO. *Kite* is a C version of this program and is intended to wean you off Basic in a gently manner.

As you can see, the programs are essentially very similar. Many BBC Basic commands are mimicked in the `bbc.h` library. So `MODE 4` becomes `bbc_mode(4)` and `CIRCLE x,y,r` becomes `bbc_circle(x,y,r)`. Others can easily be constructed, as in the example. There is no equivalent of `WAIT`, so we define a function that does the job. Similarly, there is no `SWAP` but we can define it in three lines.

Whereas a Basic program is executed in line order, C programs are defined as sets of procedures, with one main procedure which is always called `main()`, forming the entry point of the program. We define procedures that `main()` will use before `main()` itself, so they are recognised without the need for extra declaration lines.

All variables must be declared in C, either at the top if they are global or at the start of a function if they are local. This ties in with cases, as we will explain later. If you'd like to compile the example, save it in a directory `$.MyProgs.C` for example) and enter and save the obey file *MakeKite* in `$.MyProgs` also. You will need to create a directory `$.MyProgs.o` to take the intermediate object code. Run this obey file to create the program *Kite*. You'll certainly notice a difference in speed between C and Basic.

The following commands are what you need to type in, to turn the textual C program into machine code.

```
cc kite -c -i$.risc_oslib
link -o kite.o.kite
$.risc_oslib.o.risc_oslib
$.clib.o.stubs
```

`font_desc`. We can then refer to its components easily using the dot operator as follows:

```
title.xpt=4.5;
title.ypt=5.6;
strcpy(title.name,"Trinity.Bold");
```

where `strcpy()` simply copies a string from one place to another. Structures are invaluable in programming particularly when writing desktop applications. Wimp calls invariably use large parameter blocks. In Basic you usually end up writing something like:

```
!q%=handle%
q%!4=x0%
:
q%!72=...
```

and before long you've no idea where anything is! Of course, you could use long variable names to describe the various components of such parameter blocks but, because Basic is not compiled, this will make the program longer and slower.

All the structures for the Wimp and so on are pre-defined. You simply `#include` the appropriate header file and then you can use code like:

```
window->w=handle;
window->info.box=newbox;
```

To a Basic programmer this may seem as unfriendly as all the `q%s` above, but in the long run it actually makes life easier.

POINTERS

Another key feature of C is the idea of *pointers*. Basic supports them to some extent with the operators `!` and `?` for example:

```
DIM a 16
b=a
!b=14
```

Here the variable `b` is a pointer, containing an address rather than a value. At that address is placed the integer 14. In C, `b` would be defined thus: `int *b;`

Unlike Basic, C takes a more rigid approach to pointers. Addresses are not vague entities that can refer to anything – a character, a string, or an integer. The pointer `b` is expected to point to where an integer is stored and unless you specify otherwise, you will only be allowed to store integers at or read integers from `b`.

Pointers to structures are particularly useful as they enable you to pass descriptions of things easily from one procedure to another. Remember our font called `title`? Well, we could set up a pointer to it like this: `font_desc *p=&title`; and use this when referring to our font. There is a procedure in `FontUtils` which takes a pointer in this way and sets up a font descriptor block. It's defined as: `font_utils_declarefont(font_desc *d,char *name,float xpt,float ypt);`

The routine takes a pointer to font descriptor block, a font name and size and attempts to locate that font. It then stores details of that font (or the closest it can find) in the block pointed to by `d`. This use of pointers is specifically known as *call by reference* and the technique allows procedures to take parameters and alter them in some way. In the example *Kite*, *call by reference* is used. Have a look at the routine `swap` which emulates the Basic `SWAP` command. Normally when you pass, say, an integer to a procedure, it takes a copy of the value and uses that. However, if you pass the address of an integer

instead, the procedure knows where the value of that integer is stored. It can look it up and indeed alter it and `swap` does this, taking the addresses of two integers (`&` means 'address of') and swaps their contents (`*` means 'contents of') rather like Basic's `!` operator.

Although C functions can return values, like Basic ones, often pointers are used to alter variables. Not only can you alter more than one variable in this way but, when you have to deal with complicated structures like `font_desc`, it is far easier to refer to them by their address than by their value.

NEXT MONTH

A good habit to get into is to compile those parts of your application that might come in useful elsewhere as separate files. This idea will be put into practice with *Timely*.

As well as the main program, several libraries will be presented which I hope you might use in your own programs. `FontUtils` will provide a friendly way of declaring and using fonts and creating Impression-style font menus. `DrawUtils` will ease the creation of *Draw* files whereas `WimpUtils` will take some of the effort out of keeping track of your windows and icons.

So, C you again next month...

C AND THE WIMP

There's a big difference, you might think, between writing a simple stand-alone program and a full-blown multi-tasking application in C. Well, yes there is, but the standard Risc OS C libraries help to make the job simple. Acorn's version of C includes example applications, showing you the official way to do various tasks, like saving, displaying draw files, handling icons and so on.

The awkward thing about multi-tasking is that programs aren't executed linearly. You never know what the user might do – click on an icon, bring up a menu, drag a file – you can't predict which parts of your code will get called when.

In C things are simpler as many of the Risc OS functions work on the idea of handlers. A handler is any routine that you have declared capable of performing a given task. One example is a menu handler. When you create a window, you can attach menu handlers to it. So, when the user clicks on it with Menu your menu creation routine is automatically called.

Similarly, when the user selects an item on the menu, your menu select routine is called. Different menus can be attached to different windows. Icon bar menus are recognised as such and brought up at the right height on the screen.

Another good example is the `saves()` function. This provides a standard save box. Again, you simply supply handlers to do the saving. You don't have to worry about the dragging of the save icon, clicking on OK, or typing a name and pressing RETURN. You are told that the user wants to save a file – you save it, and that's that!

And, because such standard routines as `saves()` are provided, there is the added benefit that your application will be consistent in its behaviour with others written in C.

We will be covering all of these issues in more detail later on in the series.

The Fourth Dimension

THE Acorn Games Specialists

The following Fourth Dimension software is compatible with the Acorn A3000, A5000 and ALL Archimedes computers



The Real McCoy £29.95



Chopper Force £29.95 Hopefully April '92



ARCtist £24.95



The Real McCoy 2 £29.95



E-Type Compendium £24.95

For the Very Latest Full Details of All Our Software Ring (0742) 700661 or 769950

We'll send you FREE our large 16 page full colour catalogue plus our very latest product information immediately by 1st class post.



Enter The Realm £24.95



Chocks Away £24.95
Extra Missions £19.95 Compendium £39.95



Holed Out Compendium £24.95



Cataclysm £24.95



Grievous Bodily 'ARM' £24.95



Pandora's Box £24.95



Break 147 & Superpool £24.95



X-Fire £24.95



Saloon Cars £24.95

Special Offer How to Order

If you buy 2 or more products directly from us you may deduct £10 from the total cost.

Simply send us a quick letter or give us a ring telling us the software you would like, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

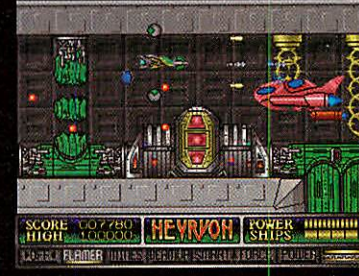
FREE SAME DAY despatch by 1ST CLASS POST

PLUS FREE Exciting Mystery 4D Games Demo Disc Sent With ALL Direct Mail Orders. PLUS ALL of our products are individually loaded by hand before leaving our offices.

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU.

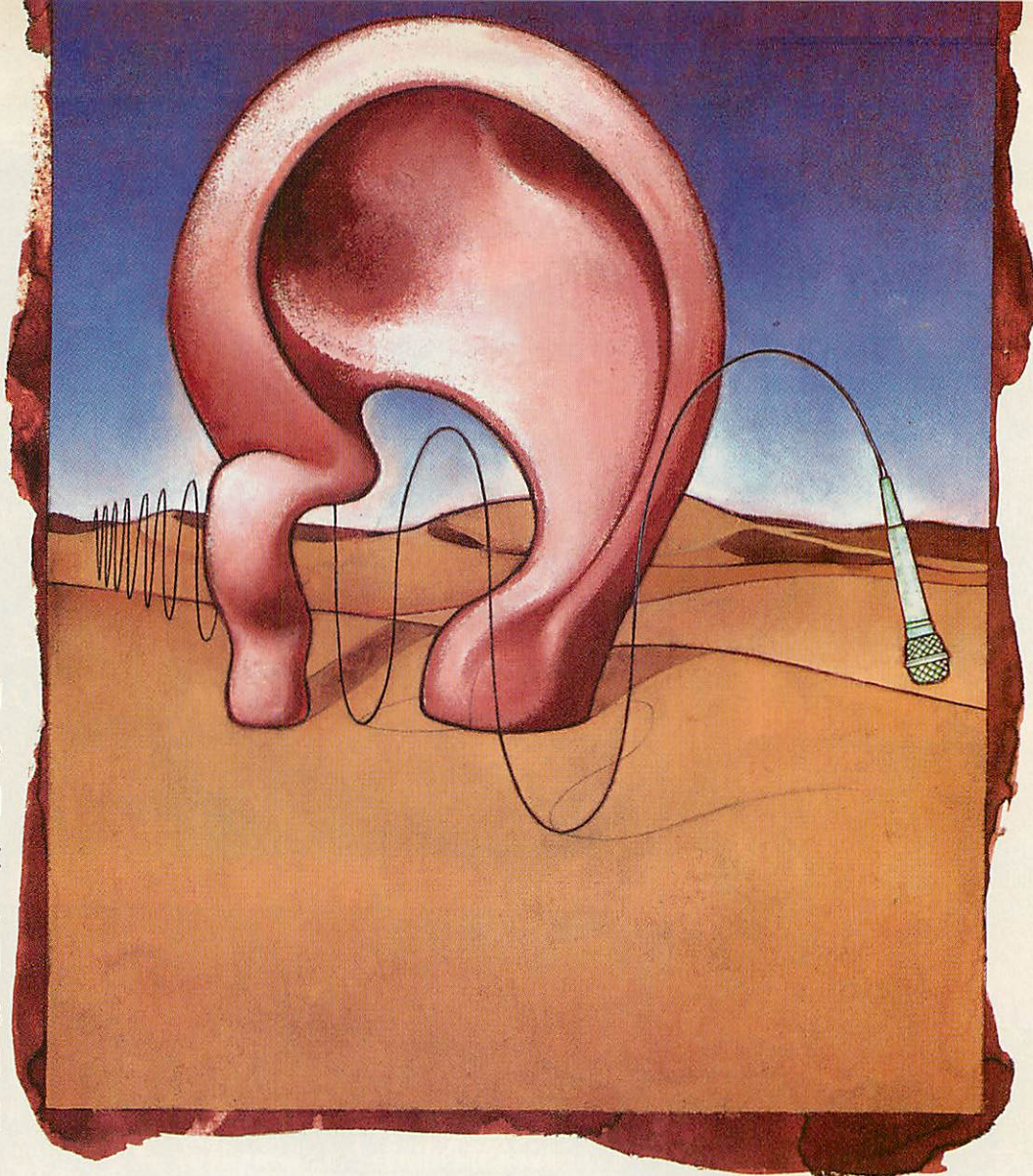


ARCtulate £24.95



Nevryon £19.95

Bells, whistles and even explosions are among the sound effects that an Arc can produce. David Radford starts a new series on the theory and practice of sound



WIRED UP FOR

SOUND

Although the Archimedes has good facilities for sound, many users fail to take advantage of them, either because they don't understand the subject, or because they lack experience of machine code. Yet sound is a worthwhile addition to many programs, whether they be educational programs with added speech or weird and wonderful noises to liven up your games programs.

This series of articles will, among other things, show that it is possible to produce a variety of sounds from Basic and we will be providing you with all you need: both the knowledge and the necessary machine code routines. But, first of all, it is important to understand the nature of sound itself...

By definition, sound is a physical vibration, transmitted through the air and detectable by the ear. When an object such as a plucked string starts to vibrate, it disturbs the air molecules around it, setting them in motion. The movement is passed from one air molecule to the next in the acoustic equivalent of a Mexican Wave. This is, in effect, a sound wave.

Sound waves cause the sensitive membrane of the eardrum, and the tiny bones beyond it, to vibrate, making it possible to hear sound. A computer can 'hear' using the electronic equivalent of an eardrum – in other words, a microphone, that converts sound waves into electric currents.

These currents can be stored on to a tape recorder for later use but a computer works using numbers rather than currents. So, to record sounds from a microphone on an Archimedes, these currents must be converted into numbers representing the strength and direction of the current. This job is done by a piece of hardware known as a sound sampler.

A sampler works by measuring the strength of the current from the microphone at a certain instance in time. This current is constantly changing so, if the sampler takes two measurements of the current one second apart, then all that is reliably known about the current during that second is its strength at the start and end of that period. It follows then, that the two measurements (or samples, as they are known)

have to be as close together as possible, thereby causing a dilemma. Each sample requires one byte of memory and so, if there are twelve bytes available, samples taken one second apart would give a period of twelve seconds. Or a more accurate series of samples, half a second apart, will last for only six seconds. As you can see, it is a case of quality versus quantity.

The length of time between two successive samples is known as the sample period and is usually measured in microseconds (millionths of a second, which is written as μs or μs). With some commercial programs you may come across the term 'sample rate', and this is the number of samples taken per second. This is measured in Hertz (Hz) or thousands of Hertz (kiloHertz or kHz).

Of course, for a sound sampler to be of practical use you need to be able to playback these recorded sounds. Luckily, all Arcs and A3000s have built-in hardware to do this. But while this is all very well, the sampler does cost money, anything from £30 to £150, and this can dissuade many people from dabbling in this fascinating subject.

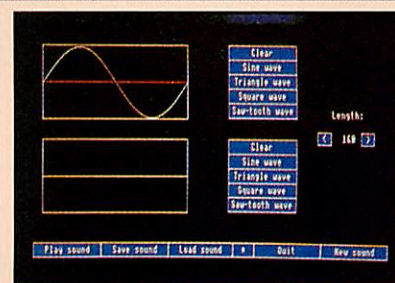
The good news is that you don't have to buy a sampler to play around with sound. Remember that we said that sampled sounds are made up of a series of numbers? Well, it is perfectly feasible to write a program that can make up these numbers from a set of simple rules. This technique is known as sound synthesis.

MAKE A SOUND

There are many different ways of synthesizing sound and the music industry is coming up with new ones all the time. Many of these are complicated, and most can only produce certain types of sound. Among these techniques are various types of modulation and harmonics, but for the

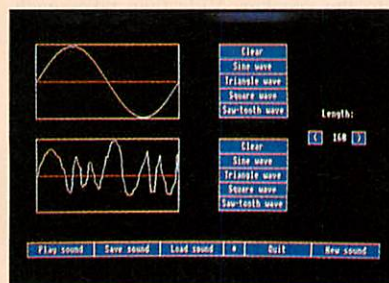
MAKING WAVES

Our first listing in the yellow pages, called *Wave*, lets you play with various sound waves. When you run it, you will be presented with two boxes, each with a cluster of icons down the right-hand side giving the four basic waves. Ignore the bottom box for the moment and click on one of the icons next to the top box. The wave you selected will then be placed into the box next to it. To listen to it, simply click on the Play sound icon at the bottom of the screen. For example, in our screenshot opposite we chose to listen to a basic sine wave. When you have played around with the four basic waves, try holding down Select over the top box and drawing your own waves. Again you can listen to it using the Play sound option. Use the Length arrows to alter the time of playback. Once you have created a simple



sound, you can save it on to disc by clicking on the Save Sound icon at the bottom of the screen and typing in a filename.

You may be wondering by now what the bottom box is for. Well, the top box represents the sound at the start of playback while the bottom box shows the sound at the end of playback. Try clicking on one of the icons to the right of the bottom box or drawing in the box itself as shown on our screenshot. When you play the sound now you should be able to hear one sound changing into another. This is a simple technique known as interpolation, and is a term more commonly associated with computer graphics. In fact, several techniques used for graphics, such as scaling shapes and drawing straight lines between fixed points, come in useful for processing sound.



first of these articles we chose a very simple approach. There are a few basic sound waves that often form the basis of synthesis routines – the sine wave, the triangle wave, the square wave and the saw-tooth wave. The program *Wave* can produce sounds from any of these wave forms. (See the Making Waves box above to find out exactly how to use the wave program and our *BAU* Program box, on page 68, for details of how to obtain the program.)

Note that you don't have to limit yourself to samples created or supplied with the *Wave* program. Any sample that conforms to the *Armadeus* format can be played back and we have provided a few on the subscribers' disc for you to try: simply choose the Load sound option and type in the filename of the sample – ours range from a grand piano to sounds of the *Starship Enterprise*. Bear in mind that these wave forms are too complicated to show in the wave box, so you will only hear the sounds.

We have also supplied a public domain program called *DSEdit* on the monthly disc. This can be used for editing sound samples. However, the format used by *DSEdit* (linear unsigned) is not the same as the *Armadeus* format used by *Wave* (linear signed). So, to allow you to convert from one format to the other, we have included another public domain program called *SampConv*. For more details on the most common formats read our Sound Formats box on the left.

TIME TO PLAY

So, once you have your sound sample, how is it output to the speaker? Well, sound is handled by the Vidc chip and what happens is this: Risc OS supplies Vidc with two buffers (temporary areas

SOUND FORMATS

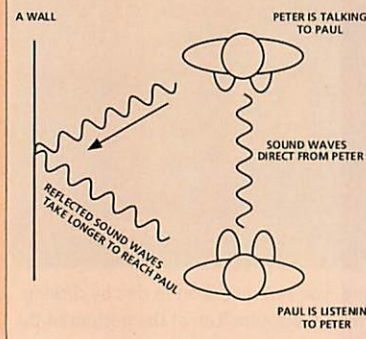
There are three basic formats for sample data: linear signed, linear unsigned and logarithmic.

- Linear signed data is a twos complement representation of the number. That is, values from 0 to 127 represent actual values 0 to +127, and values in the range 128 to 255 represent actual values -128 to -1. *Armadeus* format samples use this type of data and this is also the data type recognised by our *BAU* program, *Wave*.

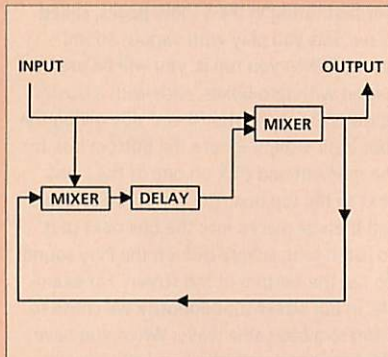
- Linear unsigned data is the type that is produced by most sound samplers. Values from 0 to 255 represent actual values - 128 to 127, with 128 representing 0. This format can easily be converted to linear signed by EORing it with 128. (ie. signed=unsigned EOR 128.) The PD application *DSEdit* uses this format for its samples.

- The third type of data is logarithmic (also known as Vidc) and this is the format required by the sound hardware of the Archimedes. It is slightly more complicated than the other formats, making use of a scale more appropriate to the human ear. There is a table maintained by Risc OS for converting from linear signed data to the logarithmic format, which is often used by voice generators.

ECHO BEACH



A real echo is caused by the fact that the sound has to travel further, creating a natural delay (see above left). In simulated sound, as in our *Echo* program, a delay can be built into the program to mimic the natural echo as illustrated in the diagram on the right.



of memory) full of sound data in a form ready to be output to the speaker. Vide then takes each byte in turn from the first buffer and sends it to the speaker at a predetermined rate. During this time, the Arc is free to be getting on with something else, such as managing the desktop.

When the first buffer becomes empty, Vide starts using data from the second buffer. At the same time, the computer stops whatever it is doing and starts executing a piece of machine code in the SoundDMA module. SoundDMA works out which buffer has just become empty, and then instructs the SoundChannels module to fill it up again with new data.

SoundChannels does this using some software known as voice generators which provide sample data or synthesis routines for filling the buffer. There are nine voice generators already built into the Archimedes, (type *voices to find out more) and there are facilities provided by the SoundChannels module for adding your own, which is exactly what the playback routine does.

All voice generators have to be written in machine code for speed, so if you can't write in machine code then you can't write your own voice generators! However, we have provided all the code necessary for playing back a sample within *Wave*, in the procedure PROCassem.

If you want to use this in your own program you can safely delete the lines from .drawwave to just before .playback, as these lines are only needed by this particular program. Have a look at PROCplay to see how to use the code.

SPECIAL EFFECTS

So now we can now make some fairly crude sounds and play them back. But you can do much more with samples than that. Once you have created a sample, it can be altered in various ways. Echo is a fairly simple effect to add and is supplied in programs such as *Armadeus* and the public domain program, *DSEdit*. The second listing in yellow pages, called *Echo*, is a short routine to add echo to any sample created by listing one.

Simulated echo is based on the fact that sound travels at a fixed speed. For instance, if Peter is talking to Paul in an enclosed space, then Paul will mainly hear sound coming directly from Peter. However, a small amount of sound will bounce off the walls and reach Paul that way. So

the sound waves arrive at Paul after different lengths of time, because of the different distances they have to travel. The result is that Paul hears the main sound, followed shortly afterwards by a fainter echo from the walls. This echo itself will bounce around the room, and arrives again at Paul some time later but much fainter and so on, until the echo becomes too faint to detect.

As sound travels very quickly, the echo is not normally noticeable in small rooms because the time difference between the two waves arriving at Paul is so small. But in large rooms such as concert halls, the distances are much greater and the echo is much more pronounced.

The diagram opposite shows how to simulate an echo. Each byte of the sample is fed directly to the output. At the same time, each byte is also fed to a circular buffer. This is used to delay the byte for a certain length of time and when it eventually emerges from the delay buffer, it is mixed with whatever the output at that time happens to be. This output is then fed back into the delay buffer at a reduced level in order to simulate the echo being reflected back again from the walls.

To translate this into a program, each byte is taken from the original sample and mixed with a certain percentage of the byte emerging from the delay buffer. This value is stored in the output sample. The value from the buffer is then mixed with a different percentage of the output, and this value is stored back into the buffer. And that's all there is to it! This is exactly how the second listing *Echo* works and it is written in machine code for speed.

You may find that *Echo* does not have much effect on the samples produced using *Wave*. This is because the volume of these samples does not vary at all. Next month's programs will work better with *Echo*, as will the samples on the monthly subscribers' disc.

Another popular effect, although not often used on the Archimedes, is fuzz. This relies on distorting a sound by chopping off the tops and bottoms of waveforms. This is a very simple idea and quite easy to program, but we won't go into detail this month as it ties in better with volume in part two of this series. Meanwhile, we have provided the *Fuzz* program in yellow pages, so you can be playing around with it until next month.

That's enough for now. Next month we'll be taking a look at how volume and pitch envelopes can be used to alter the character of sounds. Plus, we will be examining a better synthesis routine, so make sure you don't miss the next instalment!

BAU PROGRAMS

Echo, *Wave* and *Fuzz* can be copied in from yellow pages. Instructions on how to type in a program can be found on page 76. They can also be loaded directly from the monthly subscribers' disc. In addition, two related programs available to BAU subscribers are *DSEdit*, a sound sample editing program, and *SampConv* used to convert samples from one format to another. The monthly disc also provides a collection of sounds that can be used with *Wave* and *Echo*.

DISK STORAGE BOXES

3 1/2" 10 CAPACITY QTY 5	£4.50
3 1/2" 50 CAPACITY LOCKABLE	£3.70
3 1/2" 100 CAPACITY LOCKABLE	£4.70
5 1/4" 10 CAPACITY QTY 5	£4.99
5 1/4" 50 CAPACITY LOCKABLE	£3.70
5 1/4" 100 CAPACITY LOCKABLE	£4.70
200 LOCKABLE DRAWER TYPE	£18.00

ACCESSORIES

IBM PRINTER CABLE 1.8 MTR.....	£4.90
(ALSO FOR ATARI AND AMIGA)	
25 PIN M-M AND M-F 1.8 MTR.....	£4.90
36 PIN CENTRONIC M-M 1.8 MTR.....	£4.90

PRICES ONLY IF BOUGHT WITH DISKS



May 16 SANDOWN Exhibition Centre
17 Brunel Centre, Templemeads, Bristol

June 7 City Hall Candleriggs, Glasgow
14 Haydock Park, J23 M6

Sole Agent for Advance Tickets
(Use this voucher for £1 off)

J R M H Telephone: 0225 868100

**ALL FORMATS
COMPUTER FAIR**

The All Formats Computer Fair is owned and
organised by
Bruce Everiss, PO Box 71, CV33 0XS

Normal Admission £4, with this voucher £3
Only one voucher per person No Cash Value
All Fairs 10 a.m. - 4 p.m.

3 1/2" DISKS

TYPE	QTY	25	50	100
BENCHMARK DS/DD		£18.00	£31.00	£45.00
UNBRANDED DS/DD		£12.80	£21.00	£39.00
BENCHMARK DS/HD		£33.60	£61.00	£67.00
UNBRANDED DS/HD		£25.00	£36.00	£59.00

5 1/4" DISKS

TYPE	QTY	25	50	100
BENCHMARK DS/DD		£11.00	£18.00	£28.00
UNBRANDED DS/DD		£9.50	£16.00	£24.00
BENCHMARK DS/HD		£18.00	£31.50	£52.50
UNBRANDED DS/HD		£14.00	£27.00	£48.00

ALL DISKS 100% CERTIFIED ERROR FREE.
3 1/2" INC. LABELS. 5 1/4" INC. ENVELOPE AND LABEL SET.



ALL PRICES INCLUDE VAT & P&P. UK ORDERS ONLY

Cheques and
Postal Orders to:



24 HOUR
ORDERLINE
0597 851 784

Manor Court Supplies Ltd

Telephone: 0597 851 792 Fax No: 0597 851 416

Dept AU6, Glen Celyn House, Penybont,
Llandrindod Wells, Powys, LD1 5SY

EDUCATION AND GOVERNMENT ORDERS WELCOME

The best has just got better -

"My favourite package .. is Arcol, which is soon
to be upgraded" Acorn User graphics column - March 92



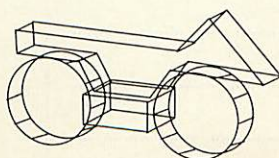
- operates in ALL 256 colour screen modes
- mixes sprites created at different resolutions
- painting with colour palettes and light/shade effects
- uses Desktop windows for loading, saving and printing

£250 +VAT site licence £50 +VAT single machine version



- 3 dimensional modeller
- real scale dimensions
- produces unfolded nets for making card models !

£280 +VAT site licence £95 +VAT single machine version



please make cheques or Postal
Orders payable to

**ExpLAN UK Ltd.,
FREEPOST
Tavistock PL19 9BR**

Phone / fax (0822) 613868

Gnome Computers Limited

25A Huntingdon Street, St. Neots, Cambs, PE19 1BG
Tel./Fax: 0480 406164 E-Mail: support@gnome.co.uk

X Window System R11.4

This software package, developed in association with
Acorn Computers, converts a RISC OS based
Archimedes into an X Terminal. The software will allow
communication with X clients over Ethernet or Econet.

X Software	£199
Complete Colour X Terminals from	£1150

Archimedes upgrades

A440/R140 4-8MB Memory Upgrade	£550
External SCSI 200MB H/D + Acorn SCSI Card	£1250
External SCSI 1.2GB H/D + Acorn SCSI Card	£2050
External 150MByte SCSI Tape Drive	£850
External 8GByte SCSI DAT Tape Drive	£1800

Transputer Systems

Gnome Computers offers a complete range of transputer
boards to fit into either RISC OS or RISC iX based
Archimedes machines. Prices start at £1385 for a single
10 MIP, 2 MFLOP transputer system including a parallel
FORTRAN-77, C, Pascal, Modula-2 or Occam compiler.

UNIX Specialists

SMALL ADS

- Archimedes A420/1, 4M Ram, colour monitor, 20Mb hard disc, manuals, original packaging only 16 months old, new condition - £950. Contact Ms K. Lewis, Cambridge. Tel: (0223) 214909
- A310 Colour, Risc OS, software, good working condition - £400, Epson LX800 9 pin dot matrix printer - £100. Contact Stephen Perugi, 8 Bure Close, Brickhill, Bedford MK41 7TX
- Learning curve A3000, nearly new with monitor, stand, mouse, cover and £300 of games - £899. Contact M. Marks, Tel: (0532) 613145
- Master 128 - £199, Acorn JP150 Inkjet printer - £199, dual floppy - £75, 30Mb hard disc - £149, Turbo - £65, Bitstik - £45. Contact Paul, Tel: (0394) 380307 (work no.)
- A310 base unit, 2nd drive interface, Ext 2nd 3.5in + PSU - £600, Microvitec 1451 monitor - £150. Contact Dr P. Holder, Surrey. Tel: 081- 391 2582 (eves only)
- Archimedes 410, 20Mb hard disc, Taxan 770 + monitor, Beebug interface, Atomwide VIDC Enhancer, software - £975. Contact Tony, Essex. Tel: 081-517 2587
- Archimedes 310, 2 x 3.5in disc drives, Philips 8833 stereo colour monitor, software, all boxed, seldom used - £450. Contact Dr G. Olivier, Bath. Tel: (0225) 835910 after 6pm
- BBC B with sideways Ram, view chip fitted 40T, 5.25in drive, mono TV lots of educational games software - £180. Tel: (0621) 852947 Essex
- 20Mb BBC Master hard disc VGC - £30. Contact Simon Nash, Woodford Green Tel: 081- 504 4057
- A3000, 2 Meg Ram, serial upgrade, monitor stand, carrying case, all manuals, new mouse - £550. Contact Robert Smallshire, West Midlands. Tel: (0384) 69798
- A3000 internal SCSI hard drive podule with external 45Mb SCSI hard drive, boxed with manual and utilities disc - £250. Contact Mr G. Rhodes, Doncaster. Tel: (0302) 722781
- Used Beeb parts, Roms, books, printer, S Ram board lots more dirt cheap. SAE to Chris Porter, "Blue Hedges", Ship Road, West Hanningfield, Chelmsford, Essex CM2 8UZ
- A3000 1Mb - £430, CUB colour monitor - £120, 92Mb 16 bit SCSI - £330 very good condition, boxed. All - £850. Contact Daniel Lane, Bourne-mouth. Tel: (0202) 418875
- Archimedes 310, colour monitor, RISC OS, dual floppy, software, fully working - £400. Contact W. Stewart, Cardiff. Tel: (0222) 664639
- For Master 128: Quest mouse, Stop press, joystick, Ref Man, view printer drivers, games, BAU discs (5.25in), - £70 o.n.o. (will split). Contact P. Beckett, Cambs. Tel: (0945) 772085 (eves)0.0.
- Acorn Cambridge workstation. BBC B, 32016 coprocessor floppy and 20Mb drives colour monitor in one case - £400 o.v.n.o. Contact David Johnson, Huntingdon. Tel: (0480) 493073
- Z80 second processor for BBC B with manuals and discs - £50. Contact Mr Tillman, Surrey. Tel: 081-941 0931
- BBC B Amber screen monitor, three 40/80T drives, shadow Ram plus Modem, lots of software inc view - £100. Contact Sarah Ereiraz, London. Tel: 081- 444 9589
- Morley A3000 2Mb memory expandable to 4Mb - £45, Ballerna by Eterna - £10, View 3 Rom and manual - £20, all original software. Contact Mr M. Sutton, Suffolk. Tel: (0440) 706674
- A3000, colour monitor, disc interface, stand, 2Mb, all manuals, apps discs plus others - £675. Contact Paul Mason, Lincs. Tel: (0476) 75706
- BBC B, DFS, 40Tr disc drive, lightpen, joysticks, CC Speech, 104 programs in Rom, 32k SW Ram, 16 Soc Romboard, manuals. Will split, ask for list. Contact Inge Saunes, 6060 Hareid, Norway.
- BBC B with 40/80 drive, games etc. New parts excellent condition - £200 no offers. Contact Ian Wolstenholme, Oldham. Tel: (061) 633 4548
- Archimedes A3000 with Acorn colour monitor PC-Emulator, First-word games, 2 Meg, as new - £680. Contact David Woodward, Derbyshire. Tel: (0332) 673784
- Archimedes 440, 53Mb hard disc, Taxan 770+, Multisync monitor, 3.5in disk drive, loads of software - offers over £1000 sought. Contact Carol Carpenter, London. Tel: 081- 445 7875
- Electron Plus1, Plus5, AMX mouse, DFS, Pixel, Perfect DTP package, inc fonts, clipart, wordpack etc - £195, Watford 256k printer buffer £85+p&p Contact Mr Graham, Middlesex. Tel: 081-847 0364.
- BBC B Taxan hi-res colour monitor, Juki 6100 printer, Watford 40/80T dual disk drives, Watford 32k Ram card, Modem, Tape recorder, some serious and game software. Mint condition - £795 o.n.o. Contact Tom Smitton, Kincardineshire. Tel: (03302) 3430
- BBC B, DFS 40/80 disc drive, cassette player, joystick, plinth, Roms include Pascal, View, Basic, 16k Sideways Ram, 32k Shadow Ram, printer generator - £340. Contact Mr D. Taylor, 202 Canon Street, Leicester LE4 6GH
- Electron 64k +1, +3, +2 Rom, View, Viewsheets, tape recorder, all leads and manuals, some games - £180, MX80 FT III printer and lead - £75. Contact Ralph Sillett, 22 Cherrybrook Drive, Penkridge, Staffs ST19 5EA
- A3000, 2Mb Ram, Acorn colour monitor, 1st word, PC-Emulator, games, excellent condition, bargain. Contact Mac. Tel: (0332) 281540
- BBC Master 128k, colour monitor, 40/80 disk drive, 256k Challenger, 80186 coprocessor, Viewstore and 3 other Roms, manuals - £500. Contact Phil, Harpenden. Tel: (0562) 767410

BAU FREE READER ADS COUPON

Why not take advantage of our free reader ad service? Fill in the details below and send this coupon (or a photocopy of it) to: Reader Ads, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

Your name.....Tel:.....

Address.....

Please write your free ad details here (in block capitals please). Maximum 25 words

.....

.....

.....

.....

- A3000 1Mb and Acorn RGB Colour monitor, PRES stand, serial upgrade, Apps discs, manuals, Holed out, Powerband, Sporting Triangles. All as new - £600. Contact Stuart Morton, Staffs. Tel: (0785) 760626 (eves)
- Archimedes A310, colour monitor, 4Mb, Backplane, Fan RISC OS, Memcia, 5.25in drive interface and drive (40/80 switchable) - any reasonable offers. Contact Gareth Hudson, Bangor. Tel: (0247) 457655 after 6pm
- Help! Urgently wanted, very cheap Archimedes A3000. Monitor may be considered. Contact Pam, Herts. Tel: (0707) 52766 (eves)
- A440 colour ZOMBHD, disc buffer twin 5.25in drives, all boxed, Risc user vols 1-4 and most discs, Multifs, Spark, Arcscan, disc companion - £1100 o.n.o. Contact Jules, Cambridge. (0223) 350446
- 60 Mb SCSI tape drive, original packaging, brand new, all cables, software etc needed to backup/restore from desktop - £425 o.n.o. Contact A. Oliver, Wisbech. Tel: (0945) 880493
- A3000 with 1Mb upgrade and colour monitor, 10Mb hard disc with external power supply - £600. Contact J. Fallon, Cambridge. Tel: day (0223) 420705 eves (0223) 880949
- BBC B Issue 7, Acorn 1770 DFS, D/S 40/80 track drive, solidisc 2MHz 128k Rom/Ram expansion - £200. Contact Chris, Derby. Tel: (0332) 830139
- A3000 2yrs old 4Mb upgrade and external 3.5in drive, CM8833 monitor, software - £800. Contact R. Hughes, Warrington. Tel: (0942) 717432.
- Acorn A3000 and colour monitor, 4Meg upgrade, PRES stand and PD software, as new - £650 for quick sale. Contact Niraj Goyal, Surrey. Tel: 081-390 0540 (eves)000
- A3000 and colour CM8833 monitor, 4Mb upgrade, PRES monitor, stand, Lemmings, Pacmania. Good condition - only £850. Contact Mr Woodhouse, Aylesbury. Tel: (0296) 613520
- Archimedes 410 with 4Mb Ram and 20Mb hard disc, Emulator (VI.60), 14in multiscan colour monitor (unused), manuals, some software - £750. Contact Richard McCraith, Wilts. Tel (0225) 882236 / 751722
- Watford Archie hand scanner for A300/400 - £90, Z88 portable micro and 256k Ram, PC link, Archielink, software - £200. Contact Mike, Sheffield. Tel: (0742) 342870
- Master 128, Interword, Spellmaster etc, dual 80T drives, Star NL10 printer, boxed, manuals - £450 may split. Arc DTO - £60. Contact Dr A. Downie, Stratford. Tel: 081-536 1238
- BBC B Issue 7, Watfords DDFS 40/80 track 5.25in drive and Olivetti printer selection of software, hardly used - £250. Contact O. Williams, Halesowen. Tel: (021) 550 3948 (eves)
- A310 upgraded to 2 Meg 5.25in drive with Dot Matrix printer and colour monitor. Contact Richard Pratt, Leics. Tel: (0530) 222510
- BBC Master 128, Philips colour monitor (RBG), Cumana 40/80, double drives, monitor stand, boxed Spellcheck, intro software, discs, all instruction books, manuals - £500. Contact Ann Taylor, Twickenham. Tel: 081-891 1241
- Acorn medium monitor bought with A3000, June 1990, not used since upgrade to Hi-Res monitor, February 1992. - £96. Contact Mr P. Coughlin, London. Tel: 071-790 1994 (eves)
- BBC B with Opus disc system, Viglen drive, Roms View, Viewsheet, Viewstore, Viewspell, Comstar, joysticks, many games, cassette player - £200, Centronics printer - £50. Contact Mr G. Wise, Reading. Tel: (0734) 341866
- Master 512k, 40/80 plinthed disc drive, cartridge, mouse, joysticks, Gem, software, books - £500, Philips TTL/RGB colour monitor - £200. Contact Mrs Elvyn Dube, Sweden. (010468) 767 9295
- Beeb video digitiser by Watfords, almost new. Bargain - £55, post paid, selling up. Contact Mr E. Clark, Cumbria. Tel: (09467) 24381
- BBC B Issue 7 - £95, Archimedes Risc-os programmers Ref manual - £59, ANSI C Rel 3 - £89. Contact Mr P. Johnson, Whitechurch. Tel: (0256) 892008
- A3000 with Acorn colour monitor - £680, Star LC24-10 printer - £120, books and discs, all hardly used. Contact Mr C. Swann, Derby. Tel: (0332) 290721
- BBC B, Pascal Rom, 40TSS look drive, hardly used, original packaging, White Knight II, Toolbox, LISP, Algebraic Manip, Picture Maker, documentation - £260 o.n.o. Contact Philip Wright, Crewe. Tel: (0270) 67941
- Star LC-200 (9 Pin) colour printer as new - £170, Acorn Electron 32K, games, tape deck, manual - £55 no offers accepted, buyer collects. Contact Mr Zephur, Tel: (0706) 817570
- A3000 Learning Curve with Acorn colour monitor and stand, 4Mb Ram, Midi/user Interface, 12 months old with extra software - £700. Contact Jeff, Merseyside. Tel: (051) 426 1506
- Company computer forces sale of A3000 2 Meg, colour monitor, boxed and unused - £700. Contact A. Solomon, Rochdale. Tel (0706) 852581
- BBC B Issue 7, Watford DFS, 40T Disk drive, Mini Office II - £160 o.n.o. Epson RX80 printer with spare ribbons - £60. Contact M Young, Tonbridge. Tel: (0732) 351814
- Archimedes A3000 computer with Acorn colour monitor, 1st word, PC-Emulator, games etc - £650. Contact M. RAI, Derby. Tel: (0332) 664962
- Master 128, disc drive, Cub monitor, overview available - £350 surplus to requirements. Good home only please apply, it is very affectionate. Contact Mike O' Toole, 3 Stanley Avenue, Chesham, Bucks HP5 2JF.
- Aries B32 Shadow Ram and B12 sideways, Rom boards with Acorn basic Editor and toolkit, Roms and 16K Ram - £40 o.n.o. Contact Mr P. Watt, Welwyn. Tel (0438) 715539
- BBC B, 40/80T, DFS1.20, NFS 3.60, Econet, WW+, Intersheet, Acorn Speech synthesizer, colour monitor, joystick, mouse, sways Ram (not fitted), Plinth, software - £275. Contact Darren Galpin, Bath. Tel: (0225) 834690 after 4.30pm
- BBC B Master 128, Philips colour monitor (RBG), Cumana 40/80 double drives, monitor stand, boxed Spellcheck, intro software, discs, all instruction boks, manuals - £500. Ms Taylor, Twickenham. Tel: 081-891 1241
- A310, 4Mb Ram, 20Mb drive, colour monitor - £700, 100Mb SCSI drive and 16 bit Fast card 151 £400, LQ400 and sheet feeder - £170. Contact Richard, Devon. Tel: (0803) 557843
- Rom/Ram podule with 6x32k battery backed Ram and Spellmaster Rom - £50. Contact M. Brooke, Lemgo Primary School, BFPO 41.
- Wanted to purchase Electron 32k cassette software suitable children 6-14 years. Contact D. Fogerty, Salisbury. Tel: (0722) 744162
- BBC Master 128, single disc drive, green monitor - £250 or nearest offer. Contact M. Collins, Worcs. Tel: (0684) 564972



TMJ Computer Software

15 Harborough Rd., Deeborough, Northants. NN14 2QX
Telephone 0536762713
Online BBs Darkhaven - 0604 413716 (24hrs)

What You See Is What You Pay

ArcTerm 7	64.00	MIG 29 Super Fulcrum	32.00	Desktop Office	110.00
Articulate	22.00	MIG 29 Fulcrum	31.00	Protex V5	135.00
Bambuzzle	17.00	Nevryon	18.00		
Blitz	20.00	PC Emulator	114.00	Educational	
Bug Hunter In Space	12.00	PACMANIA	17.00	Fun School 2 (All Ages)	17.00
Bug Hunter	12.00	PANDORAS BOX	22.00	Fun School 3 (All Ages)	22.00
Break 147 & Superpool	30.00	Repton 3	17.00	Fun School 4 (All Ages)	22.00
Chocks Away	22.00	Speech	17.00	Lets Spell at Home	21.00
Chocks Away Extra	18.00	Schema	114.00	Lets Spell at the Shops	21.00
Chess 3D	17.00	Superior Golf	17.00		
Chequered Flag	22.00	Saloon Cars	22.00	Hardware	
Compression	50.00	The Real McCoy	30.00	Armadeus Sampler	141.00
Chopper Force	??	The Real McCoy 2	30.00	Arc/A3000 Game Contrl	36.00
Cataclysm	22.00	Top Banana	21.99	Serial Port Interface	30.00
Chuck Rock	22.00	Waterloo	22.00	Micro Mouse	32.00
ELITE	38.00	Zelanites	20.00		
Enter The Realm	22.00	X-Fire	22.00	3.5 inch Disc boxes	
Flight Sim. Tool Kit	39.00			80 Capacity	8.00
Greivous Bodily ARM	22.00			100 Capacity	10.00
Home Accounts	40.00				
Hostages	17.00			Printer Ribbons	
Interdictor 2	30.00			KXP1080,1081,1180	4.50
James Pond	22.00			STAR NL 10/NX 10	5.00
LEMMINGS	22.00			STAR LC10 & NX1000	4.50
Legend of the Lost Temple	22.00			STAR LC200 Mono	4.50
Kerbang	17.00			Colour	13.75
Mad Professor Mariarti	17.00			Citizen 120D	4.50
Man United Football	22.00			Epson LQ 4/500/550/850	4.50
Man. U. in Europe	22.00			Epson LX80	1.50
Microdrive Extra Courses	13.00				
Microdrive World Edition	26.00			Dust Covers	
Master Break	17.00			A3000 (Keyboard only)	7.00
				A3000 & Monitor	10.00
				Archimedes 2pc	10.00
				Odds and Ends	
				Mouse mats	3.00
				3.5in Disc Head Cleaners	3.50

SPECIAL OFFER BOX	
KARMA	£22.00
The Real McCoy 1 & 2	£56.00
Chocks Away Compendium	£33.50
Holed Out Compendium	£22.00
E - Type Compendium	£22.00
Bobby Block Head or Aggressor	£16.00

Disks!	
3.5 inch.....	13 for £6.50
A3000 Upgrades	
1 MEG	£53.00
4 MEG	£160.00

All prices include VAT and P&P
Access and Visa Accepted
Open Mon-Fri 9.30am - 12.30
1.30pm - 6.30
Saturdays 9.30am - 12.30

Everything's a Bargain!

APOLOGIES TO ALL THOSE WHO DON'T LIVE NEAR BROMLEY

You probably won't be able to pop in to our newly refurbished showroom, browse through our 250+ software titles for the Archimedes/A3000/A5000 (or 100+ titles for the trusty old BBC Micro and Master Series), sit down and use one of our seven demonstration systems (including the new A5000), chat with our knowledgeable staff, make use of our high-quality repair workshop, or even just sit down for a cup of coffee!

BUT....

at least you can use our speedy mail-order service, even for repairs, and we also accept telephone orders by Access/MasterCard and Visa, so all is not lost!

THE DATA STORE

6 CHATTERTON ROAD, BROMLEY, KENT, BR2 9QN
Tel: 081-460 8991 Fax: 081-313 0400
(Closed Wednesdays)

SAVE OVER £100

A3000 Computer ^{plus} Learning Curve Software 14" Acorn Colour Monitor & Monitor Stand

No printer	£855
with Mannesmann MT81 (9 pin) printer	£999
with Citizen Swift 9 (9 pin) printer	£1075
with Citizen 224 (24 pin) printer	£1100

A3000 - 1mb upgrade	£60
Citizen Colour Kit	£38

A5000 Computer(2mb) ^{plus} Learning Curve Software 14" Acorn Multisync Colour Monitor & Monitor Stand

No printer	£1799
with Mannesmann MT81 (9 pin) printer	£1945
with Citizen Swift 9 (9 pin) printer	£2019
with Citizen 224 (24 pin) printer	£2044

A540 Computer	£2400
---------------	-------

Starter Kit - Worth Over £100

Yours Absolutely Free of Charge when you buy any of the printer packs. It Contains:-

- 1 Printer Cable
- 1 Printer Stand
- 1 Printer Driver Disc
- 1 Dust Cover (Computer)
- 1 Dust Cover (Printer)
- 10 Discs
- 1 Disc Box
- 250 Sheets Continuous Paper
- 100 Address Labels
- &
- 1 Typing Tutor Program

Send for full catalogue of computers, peripherals, & consumables.

TERMS

CHEQUE WITH ORDER
CREDIT CARDS Access & Visa

DELIVERY CHARGES:

£10 per machine

ALL PRICES EXCLUDE VAT:

Office Hours:

10.00am - 5.00pm Mon-Fri (Lunch 1.00-2.00)
10.00am - 1.00pm Sat

Special Education Prices

All Education Establishments qualify for special education prices on Micros, etc.
Please contact us for a quotation.

Subject to availability despatch is normally effected within 2 days from receipt of cleared payment. Please allow 7 working days for cheque clearance. Prices subject to variation without notice. All orders will be fulfilled within 28 days unless otherwise notified.

Willow Micros

Unit 11, Chancellors Pound,
Redhill, BRISTOL BS18 7TZ

Tel: 0934 - 863350

Fax: 0934 - 863292



Program	Page	BBC B	B+/	Master	Master	Electron	6502SP/	ADFS	Econet	Shadow Archimedes/	Monthly
		B+	128	128	Compact		Turbo			Ram A3000/A5000	disc
*INFO	71										
Info1								*	*	*	*
Info2		*	*	*	*	*	*	*	*	*	*
Info3 - 9											*
Info10		*	*	*	*	*	*	*	*	*	*
Arc Assembly	54							*	*	*	*
Wired for Sound	70							*	*	*	*
C For Yourself	65							*	*	*	*
!Graph Bonus Listing								*	*	*	*

Typing in listings from the yellow pages.

The yellow pages are subdivided into article headings. Each article heading corresponds with its article in the magazine.

So for instance to find listing one of *INFO in the yellow pages (Termite32) look for the *INFO heading, then follow the listings through until you get to listing five.

At the beginning of the program are a few lines that tell you what machines it works on. This information can also be derived from the table above.

For Archimedes owners it may not be immediately obvious how to actually type in the listings. By pressing Function key 12 you can access the command line. From here type BASIC and the Archimedes will enter the Basic language. You may like to type MODE 12, which will turn the screen to white on black.

Then simply copy each line of the program in turn after the '>' prompt, pressing RETURN when finished. Save the program onto disc by typing SAVE "<filename>". It can then be run by typing RUN. You will probably need to debug it as you may have made some typing errors.

When you have finished debugging save the program one last time. Then it can either be double-clicked upon from the desktop, or loaded using LOAD "<filename>".

A more detailed description of how to type in listings from the yellow pages appears in BBC Acorn User August 91.

*INFO

Listing 1 - Termite32

```
10 REM >Termite32 (Info1)
20 REM Turing Termite
30 REM by Michael Rozdoba
40 REM for 32-bit machines
50 REM (c) BAU June 1992
60 :
70 MODE 13
80 PROCassemble
90 PROCinitialise
100 ON ERROR IF INKEY-1 OR ERR<>17 REP
ORT:PRINT" at line ";ERL:END
110 PROCselect
120 CALL termite
130 END
140 :
150 DEF PROCinitialise
160 l=ASC"L":r=ASC"R":b=ASC"B":f=ASC"F"
"
170 bla=0:red=20:gre=96:blu=134
180 yel=red+gre:mag=blu+red:cya=blu+gr
e:whi=blu+gre:red
190 tint=3
200 red=tint:gre+=tint:yel+=tint
210 blu=tint:mag+=tint:cya+=tint:whi+
=tint
220 A=0:B=1:C=2:D=3
230 E=4:F=5:G=6:H=7
240 end%-9999
250 q%=2
260 m%=0
270 REPEAT
280 READ d%
290 IF d%<m% AND d%<end% m%=d%
300 q%+=1
310 UNTIL d%=end%
320 nsy%=m%
330 ENDPROC
340 :
350 DEF PROCselect
360 ON
370 REPEAT
380 PRINTTAB(0,0);"System (1-"+STR$nsy
%+" ) ";
390 INPUT sy%
400 UNTIL sy%>=1 AND sy%<=nsy%
410 RESTORE
420 REPEAT
430 READ d%
440 UNTIL d%=-sy%
450 READ q%
460 WHILE q%>=0
470 READ w%,c%,d%,s%
480 ar!(32*q%+4*w%)=c%+256*s%+65536*d%
490 READ q%
500 ENDWHILE
510 OFF
520 CLS
530 ENDPROC
540 :
550 DEF PROCassemble
560 DIM code% &400
570 lcode%&149:code%&14=-1
580 SYS "OS_ReadVduVariables",code%,co
de%
590 screen=lcode%
600 count=0:temp1:=temp2=2
610 table3:=x=4:y=5:xi=6:yi=7
620 scrst=8:state=9:data=10
630 const=11:col=12
640 link=14:pc=15
650 FOR pass%=0 TO 2 STEP 2
660 P%=code%
670 [OPT pass%
680 termite
690 ADR table,ar
700 LDR scrst,ascrst
710 MOV const,#255
720 MOV x,#160
730 MOV y,#128
740 MOV xi,#1
750 MOV yi,#0
760 MOV state,#0
770 .loop MOV count,#1024
780 .innerloop
790 ADD temp,scrst,y,LSL #8
800 ADD temp,temp,y,LSL #6
810 LDRB col,[temp,xi]!
820 ADD temp2,table,state,LSL #5
830 LDR data,[temp2,col,LSL #2]
840 STRB data,[temp]
850 MOV temp,data,LSR #16
860 MOV temp2,yi
870 CMP temp,#ASC"L"
880 RSBEQ temp2,xi,#0
890 MOVEQ xi,yi
900 CMP temp,#ASC"R"
910 MOVEQ temp2,xi
920 RSBEQ xi,yi,#0
930 CMP temp,#ASC"B"
940 RSBEQ temp2,yi,#0
950 RSBEQ xi,xi,#0
960 MOV y!,temp2
970 ADDS x,x,xi
980 ADDWI x,x,#320
990 CMP x,#320
1000 MOVEQ x,#0
1010 ADDS y,y,yi
1020 MOVMI y,#255
1030 CMP y,#256
1040 MOVEQ y,#0
1050 AND state,const,data,LSR #8
1060 SUBS count,count,#1
1070 BNE innerloop
1080 SWI "OS_ReadEscapeState"
1090 BCC loop
1100 MOV pc,link
1110 .ascrst EQUED screen
1120 .ar
1130 ]
1140 NEXT
1150 ENDPROC
1160 :
1170 DATA -1, A,bla,red,1,A,A,red,bla
,r,A
1180 DATA -2, A,bla,gre,1,A,A,gre,bla
,f,B
1190 DATA B,bla,gre,r,A,A,B,gre,gre
,r,A
1200 DATA -3, A,bla,mag,r,A,A,mag,blu
,r,A,A,blu,gre,1,A,A,gre,bla,1,A
1210 DATA -4, A,bla,red,b,A,A,red,yel
,r,A,A,yel,gre,f,A,A,gre,bla,1,B
1220 DATA B,bla,gre,b,B,B,gre,yel
,r,B,B,yel,red,f,B,B,red,bla,1,A
1230 DATA -5, A,bla,red,b,A,A,red,yel
,r,A,A,yel,gre,1,A,A,gre,bla,1,B
```

Listing 2 - Termite8

```
1240 DATA B,bla,gre,b,B,B,gre,yel
,r,B,B,yel,red,1,B,B,red,bla,1,A
1250 DATA -6, A,bla,mag,r,A,A,mag,blu
,1,A,A,blu,gre,1,A,A,gre,bla,r,A
1260 DATA end%
600 xo=&88
610 yo=&8C
620 FOR pass%=0 TO 2 STEP 2
630 P%=code%
640 [OPT pass%
650 termite
660 LDA #80
670 STA x
680 LDA #128
690 STA y
700 LDA #0
710 STA dir
720 STA state
730 .loop
740 LDY #0
750 STY addr+1
760 LDA x
770 LSR A
780 ROR xbit
790 ASL A
800 ASL A
810 ROL addr+1
820 ASL A
830 ASL A
840 STA addr
850 LDA y
860 LSR A
870 LSR A
880 LSR A
890 TAX
900 LDA y
910 AND #7
920 ORA lo%,X
930 CLC
940 ADC addr
950 STA addr
960 LDA hi%,X
970 ADC addr+1
980 STA addr+1
990 LDA (addr),Y
1000 BIT xbit
1010 BMI peek2
1020 LSR A
1030 .peek2
1040 TAX
1050 LDA state
1060 ORA peektab%,X
1070 TAX
1080 LDY table,X
1090 LDA poketab%,Y
1100 STA temp
1110 LDA #&AA
1120 BIT xbit
1130 BMI poke2
1140 LSR A
1150 ASL temp
1160 .poke2
1170 LDY #0
1180 AND (addr),Y
1190 ORA temp
1200 STA (addr),Y
1210 LDA table+1,X
1220 STA state
1230 LDA dir
1240 CLC
1250 ADC table+2,X
1260 STA dir
1270 AND #3
1280 TAX
1290 LDA x
1240 DATA B,bla,gre,b,B,B,gre,yel
,r,B,B,yel,red,1,B,B,red,bla,1,A
1250 DATA -6, A,bla,mag,r,A,A,mag,blu
,1,A,A,blu,gre,1,A,A,gre,bla,r,A
1260 DATA end%
600 xo=&88
610 yo=&8C
620 FOR pass%=0 TO 2 STEP 2
630 P%=code%
640 [OPT pass%
650 termite
660 LDA #80
670 STA x
680 LDA #128
690 STA y
700 LDA #0
710 STA dir
720 STA state
730 .loop
740 LDY #0
750 STY addr+1
760 LDA x
770 LSR A
780 ROR xbit
790 ASL A
800 ASL A
810 ROL addr+1
820 ASL A
830 ASL A
840 STA addr
850 LDA y
860 LSR A
870 LSR A
880 LSR A
890 TAX
900 LDA y
910 AND #7
920 ORA lo%,X
930 CLC
940 ADC addr
950 STA addr
960 LDA hi%,X
970 ADC addr+1
980 STA addr+1
990 LDA (addr),Y
1000 BIT xbit
1010 BMI peek2
1020 LSR A
1030 .peek2
1040 TAX
1050 LDA state
1060 ORA peektab%,X
1070 TAX
1080 LDY table,X
1090 LDA poketab%,Y
1100 STA temp
1110 LDA #&AA
1120 BIT xbit
1130 BMI poke2
1140 LSR A
1150 ASL temp
1160 .poke2
1170 LDY #0
1180 AND (addr),Y
1190 ORA temp
1200 STA (addr),Y
1210 LDA table+1,X
1220 STA state
1230 LDA dir
1240 CLC
1250 ADC table+2,X
1260 STA dir
1270 AND #3
1280 TAX
1290 LDA x
```




```

1300 CLC
1310 ADC xo,X
1320 CMP #160
1330 BCC xnotoff
1340 BNE xisneg
1350 LDA #0
1360 BEQ xnotoff \ =JMP
1370 .xisneg
1380 LDA #159
1390 .xnotoff
1400 STA x
1410 LDA y
1420 CLC
1430 ADC yo,X
1440 STA y
1450 BIT &FF
1460 BPL loop
1470 RTS
1480 !
1490 lo=x:P%=P%+32
1500 hi=x:P%=P%+32
1510 peektab=x:P%=P%+128
1520 table=x:P%
1530 NEXT
1540 FOR i%=0 TO 31
1550 a%=x3000+640*i%
1560 lo=i%:a% MOD 256
1570 hi=i%:a% DIV 256
1580 NEXT
1590 FOR i%=0 TO 127
1600 i%pekktab=(i% AND 1)*4+(i% AND 4)*2+(i% AND 16)
1610 NEXT
1620 FOR i%=0 TO 7
1630 i%pkoketab=(i% AND 1)*2+(i% AND 2)*4+(i% AND 4)
1640 NEXT
1650 !xo=&00FF0001
1660 !yo=&0100FF00
1670 ENDPROC
1680 :
1690 DATA -1
1700 DATA A,bla,red,l,A, A,red,bla,r,A
1710 DATA -2
1720 DATA A,bla,gre,l,A, A,gre,bla,f,B
1730 DATA B,bla,gre,r,A, B,gre,gre,r,A
1740 DATA -3
1750 DATA A,bla,mag,r,A, A,mag,blu,r,A
1760 DATA A,blu,gre,l,A, A,gre,bla,l,A
1770 DATA -4
1780 DATA A,bla,red,b,A, A,red,yel,r,A
1790 DATA A,yel,gre,f,A, A,gre,bla,l,B
1800 DATA B,bla,gre,b,B, B,gre,yel,r,B
1810 DATA B,yel,red,f,B, B,red,bla,l,A
1820 DATA -5
1830 DATA A,bla,red,b,A, A,red,yel,r,A
1840 DATA A,yel,gre,l,A, A,gre,bla,l,B
1850 DATA B,bla,gre,b,B, B,gre,yel,r,B
1860 DATA B,yel,red,l,B, B,red,bla,l,A
1870 DATA -6
1880 DATA A,bla,mag,r,A, A,mag,blu,l,A
1890 DATA A,blu,gre,l,A, A,gre,bla,r,A
1900 DATA end%

```

Listing 3 - Lines

```

10 REM >Lines (Info3)
20 REM Dithered lines
30 REM by Jan Vibe
40 REM for 32-bit machines
50 REM (c) BAU June 1992
60 :
70 MODE 15
80 OFF
90 DIM ct%(255),pt%(8,4,32)
100 FOR i%=1 TO 32
110 FOR n%=1 TO i%
120 REPEAT
130 x%=RND(8)
140 y%=RND(4)
150 UNTIL pt%(x%,y%,i%)=0
160 pt%(x%,y%,i%)=1
170 NEXT
180 NEXT
190 RESTORE 910
200 FOR n%=0 TO 255
210 READ ct%(n%)
220 NEXT
230 :
240 REPEAT
250 x1%=RND(1180)+50
260 y1%=RND(924)+50
270 x2%=RND(1180)+50
280 y2%=RND(924)+50
290 b%=RND(73)+7
300 c1%=RND(27)-1
310 c2%=RND(27)-1
320 PROC1(x1%,y1%,x2%,y2%,b%,c1%,c2%)
330 UNTIL FALSE
340 :
350 DEF PROC1(x1%,y1%,x2%,y2%,b%,c1%,c2%)
360 LOCAL d%,n%,m%,f%,x,y,z,s%,p%,f1%,f2%,gp%
370 d%=SQR((x2%-x1%)^2+(y2%-y1%)^2)
380 dx=(x2%-x1%)/d%
390 dy=(y2%-y1%)/d%
400 f%=RND(27)-1
410 FOR m%=0 TO 7
420 z=b%-m%*b%/7.5
430 s%=z/4
440 IF s%<2 s%=2
450 PROCf(c1%,m%)
460 f1%=c%
470 PROCf(c2%,m%)
480 f2%=c%
490 FOR n%=0 TO d% STEP s%
500 x=(n%*x2%+(d%-n%)*x1%)/d%
510 y=(n%*y2%+(d%-n%)*y1%)/d%

```

```

520 gp%=p%
530 p%=32*n%/d%
540 IF p%<gp% PROCp(f1%,f2%,p%)
550 CIRCLE FILL x,y,z
560 NEXT
570 PROCf(c1%,m%)
580 CIRCLE FILL x2%,y2%,z
590 NEXT
600 ENDPROC
610 :
620 DEF PROCp(c1%,c2%,p%)
630 LOCAL n%,m%,k%
640 FOR m%=1 TO 4
650 VDU 23,m%+1
660 FOR n%=1 TO 8
670 k%=pt%(n%,m%,p%)
680 VDU k%*c1%+(1-k%)*c2%
690 NEXT
700 NEXT
710 GCOL 80,0 TINT c%
720 FOR n%=1 TO 8
730 SWAP pt%(RND(8),RND(4),p%),pt%(RND(8),RND(4),p%)
740 NEXT
750 ENDPROC
760 :
770 DEF PROCf(f%,i%)
780 LOCAL r%,g%,b%
790 b%=f% DIV 9
800 f%=-9*b%
810 g%=f% DIV 3
820 f%=-3*g%
830 r%=f%
840 f%=r%+4*g%+16*b%
850 IF i%>4 f%=f%+15:i%=i% MOD 4
860 i%=64*i%
870 GCOL f% TINT i%
880 c%=ct%(f%+i%)
890 ENDPROC
900 :
910 DATA 0,4,16,20,32,36,48,52,64,68,80,84,96,100,112,116
920 DATA 8,12,24,28,40,44,56,60,72,76,88,92,104,108,120,124
930 DATA 128,132,144,148,160,164,176,180,192,196,208,212,224,228,240,244
940 DATA 136,140,152,156,168,172,184,188,200,204,216,220,232,236,248,252
950 DATA 1,5,17,21,33,37,49,53,65,69,81,85,97,101,113,117
960 DATA 9,13,25,29,41,45,57,61,73,77,89,93,105,109,121,125
970 DATA 129,133,145,149,161,165,177,181,193,197,209,213,225,229,241,245
980 DATA 137,141,153,157,169,173,185,189,201,205,217,221,233,237,249,253
990 DATA 2,6,18,22,34,38,50,54,66,70,82,86,98,102,114,118
1000 DATA 10,14,26,30,42,46,58,62,74,78,90,94,106,110,122,126
1010 DATA 130,134,146,150,162,166,178,182,194,198,210,214,226,230,242,246
1020 DATA 138,142,154,158,170,174,186,190,202,206,218,222,234,238,250,254
1030 DATA 3,7,19,23,35,39,51,55,67,71,83,87,99,103,115,119
1040 DATA 11,15,27,31,43,47,59,63,75,79,91,95,107,111,123,127
1050 DATA 131,135,147,151,163,167,179,183,195,199,211,215,227,231,243,247
1060 DATA 139,143,155,159,171,175,187,191,203,207,219,223,235,239,251,255

```

Listing 4 - GiantECF

```

10 REM >GiantECF (Info4)
20 REM by Dave Acton
30 REM for 32-bit machines only
40 REM (c) BAU June 1992
50 :
60 MODE 4
70 PRINT"BAU"
80 FOR ecf%=0 TO 3
90 VDU 23,ecf%
100 FOR y%=0 TO 7
110 a%=0
120 FOR x%=0 TO 7
130 a%+=POINT(ecf%*32+x%*4,1023-4*y%)*c(7-x%)
140 NEXT
150 VDU a%
160 NEXT
170 NEXT
180 FOR test%=1 TO 500
190 x%=RND(1000)+140
200 y%=RND(600)+140
210 r%=RND(120)+20
220 GCOL 0,0
230 CIRCLE FILL x%,y%,r%+8
240 GCOL 80,0
250 CIRCLE FILL x%,y%,r%
260 GCOL 0,1
270 CIRCLE x%,y%,r%
280 NEXT
290 NEXT

```

Listing 5 - AlienTree

```

10 REM >AlienTree (Info5)
20 REM by Jan Vibe
30 REM for 32-bit machines
40 REM (c) BAU June 1992
50 :
60 MODE 15
70 OFF
80 DIM ct%(255),pt%(8,4,32)
90 FOR i%=1 TO 32
100 FOR n%=1 TO i%
110 REPEAT
120 x%=RND(8)
130 y%=RND(4)
140 UNTIL pt%(x%,y%,i%)=0
150 pt%(x%,y%,i%)=1
160 NEXT
170 NEXT
180 RESTORE 910
190 FOR n%=0 TO 255
200 READ ct%(n%)
210 NEXT
220 :
230 DEF PROC1(x1%,y1%,x2%,y2%,b%,c1%,c2%)
240 LOCAL d%,n%,m%,f%,x,y,z,s%,p%,f1%,f2%,gp%
250 d%=SQR((x2%-x1%)^2+(y2%-y1%)^2)
260 dx=(x2%-x1%)/d%
270 dy=(y2%-y1%)/d%
280 z=b%-m%*b%/7.5
290 s%=z/4
300 IF s%<2 s%=2
310 PROCf(c1%,m%)
320 f1%=c%
330 PROCf(c2%,m%)
340 f2%=c%
350 FOR n%=0 TO d% STEP s%
360 x=(n%*x2%+(d%-n%)*x1%)/d%
370 y=(n%*y2%+(d%-n%)*y1%)/d%
380 gp%=p%
390 IF p%<gp% PROCp(f1%,f2%,p%)
400 CIRCLE FILL x,y,z
410 NEXT
420 PROCf(c1%,m%)
430 CIRCLE FILL x2%,y2%,z
440 ENDP
450 ENDP
460 :
470 DEF PROCp(c1%,c2%,p%)
480 LOCAL n%,m%,k%
490 FOR m%=1 TO 4
500 VDU 23,m%+1
510 FOR n%=1 TO 8
520 k%=pt%(n%,m%,p%)
530 VDU k%*c1%+(1-k%)*c2%
540 NEXT
550 NEXT
560 :
570 GCOL 80,0 TINT c%
580 FOR n%=1 TO 4
590 SWAP pt%(RND(8),RND(4),p%),pt%(RND(8),RND(4),p%)
600 NEXT
610 :
620 DEF PROCf(f%,i%)
630 LOCAL r%,g%,b%
640 b%=f% DIV 9
650 f%=-9*b%
660 g%=f% DIV 3
670 f%=-3*g%
680 r%=f%
690 f%=r%+4*g%+16*b%
700 IF i%>4 f%=f%+15:i%=i% MOD 4
710 i%=64*i%
720 GCOL f% TINT i%
730 c%=ct%(f%+i%)
740 ENDP
750 :
760 DATA 0,4,16,20,32,36,48,52,64,68,80,84,96,100,112,116
770 DATA 8,12,24,28,40,44,56,60,72,76,88,92,104,108,120,124
780 DATA 128,132,144,148,160,164,176,180,192,196,208,212,224,228,240,244
790 DATA 136,140,152,156,168,172,184,188,200,204,216,220,232,236,248,252
800 DATA 1,5,17,21,33,37,49,53,65,69,81,85,97,101,113,117
810 DATA 9,13,25,29,41,45,57,61,73,77,89,93,105,109,121,125
820 DATA 129,133,145,149,161,165,177,181,193,197,209,213,225,229,241,245
830 DATA 137,141,153,157,169,173,185,189,201,205,217,221,233,237,249,253
840 DATA 2,6,18,22,34,38,50,54,66,70,82,86,98,102,114,118
850 DATA 10,14,26,30,42,46,58,62,74,78,90,94,106,110,122,126
860 DATA 130,134,146,150,162,166,178,182,194,198,210,214,226,230,242,246
870 DATA 138,142,154,158,170,174,186,190,202,206,218,222,234,238,250,254
880 DATA 3,7,19,23,35,39,51,55,67,71,83,87,99,103,115,119
890 DATA 11,15,27,31,43,47,59,63,75,79,91,95,107,111,123,127
900 DATA 131,135,147,151,163,167,179,183,195,199,211,215,227,231,243,247
910 DATA 139,143,155,159,171,175,187,191,203,207,219,223,235,239,251,255

```

```

120 x%=RND(8)
130 y%=RND(4)
140 UNTIL pt%(x%,y%,i%)=0
150 pt%(x%,y%,i%)=1
160 NEXT
170 NEXT
180 RESTORE 1380
190 FOR n%=0 TO 255
200 READ ct%(n%)
210 NEXT
220 k%=1000
230 DIM xa%(k%),ya%(k%),xb%(k%),yb%(k%),b%(k%),ca%(k%),cb%(k%)
240 DIM fx%(k%),fy%(k%),fl%(k%)
250 PROCf(16,0)
260 RECTANGLE FILL 0,0,1280,300
270 PROCf(21,7)
280 RECTANGLE FILL 0,300,1280,724
290 FOR n%=500 TO 200 STEP -1
300 ma%=RND(n%/4)+8
310 mi%=RND(ma%/2)+4
320 PROCf(26,RND(4)+3)
330 ELLIPSE FILL RND(1280),RND(400)+50,ma%,mi%
340 NEXT
350 GCOL 0 TINT 0
360 ct%=0
370 ft%=0
380 PROCA(640,0,260,RND(27)-1,0,64,1)
390 FOR m%=0 TO 7
400 FOR n%=1 TO ct%
410 PROCL(xa%(n%),ya%(n%),xb%(n%),yb%(n%),b%(n%),ca%(n%),cb%(n%))
420 NEXT
430 NEXT
440 FOR n%=1 TO ft%
450 fc%=RND(27)-1
460 r%=RND(fl%(n%))+fl%(n%)
470 FOR m%=0 TO 7
480 d%=r%-r%*m%/7
490 PROCf(fc%,m%)
500 CIRCLE FILL fx%(n%),fy%(n%),d%
510 NEXT
520 NEXT
530 END
540 :
550 DEF PROCA(x1%,y1%,x%,c1%,v%,b%,d%)
560 LOCAL x2%,y2%,c2%,zm%,t
570 zm%=x%
580 IF x%<32 zm%=1.5*x%
590 t=RAD(v%)
600 x2%=x1%+zm%*SIN(t)
610 y2%=y1%+zm%*COS(t)
620 c%=RND(27)-1
630 ct%=1
640 xa%(ct%)=x1%
650 ya%(ct%)=y1%
660 xb%(ct%)=x2%
670 yb%(ct%)=y2%
680 b%(ct%)=b%
690 ca%(ct%)=c1%
700 cb%(ct%)=c2%
710 LINE x1%,y1%,x2%,y2%
720 IF x%>32 THEN
730 PROCA(x2%,y2%,x%/(1.2+RND(1)*.3),c2%,y%+30-RND(20),b%/1.5,d%+1)
740 PROCA(x2%,y2%,x%/(1.2+RND(1)*.3),c2%,y%+30-RND(20),b%/1.5,d%+1)
750 ELSE
760 ft%+=1
770 fx%(ft%)=x2%
780 fy%(ft%)=y2%
790 fl%(ft%)=x%/3
800 ENDP
810 ENDP
820 :
830 DEF PROC1(x1%,y1%,x2%,y2%,b%,m%,c2%,c1%)
840 LOCAL d%,n%,f%,x,y,z,s%,p%,f1%,f2%,gp%
850 d%=SQR((x2%-x1%)^2+(y2%-y1%)^2)
860 dx=(x2%-x1%)/d%
870 dy=(y2%-y1%)/d%
880 z=b%-m%*b%/7.5
890 s%=z/2
900 IF s%<2 s%=2
910 PROCf(c1%,m%)
920 f1%=c%
930 PROCf(c2%,m%)
940 f2%=c%
950 IF z>=2 OR m%=0 THEN
960 FOR n%=0 TO d% STEP s%
970 x=(n%*x2%+(d%-n%)*x1%)/d%
980 y=(n%*y2%+(d%-n%)*y1%)/d%
990 gp%=p%
1000 p%=32*n%/d%
1010 IF p%<gp% PROCp(f1%,f2%,p%)
1020 CIRCLE FILL x,y,z
1030 NEXT
1040 PROCf(c1%,m%)
1050 CIRCLE FILL x2%,y2%,z
1060 ENDP
1070 ENDP
1080 :
1090 DEF PROCp(c1%,c2%,p%)
1100 LOCAL n%,m%,k%
1110 FOR m%=1 TO 4
1120 VDU 23,m%+1
1130 FOR n%=1 TO 8
1140 k%=pt%(n%,m%,p%)
1150 VDU k%*c1%+(1-k%)*c2%
1160 NEXT
1170 NEXT
1180 GCOL 80,0 TINT c%
1190 FOR n%=1 TO 4
1200 SWAP pt%(RND(8),RND(4),p%),pt%(RND(8),RND(4),p%)
1210 NEXT
1220 ENDP

```

```

1230 :
1240 DEF PROCf(f%,i%)
1250 LOCAL r%,g%,b%
1260 b%=f% DIV 9
1270 f%=-9*b%
1280 g%=f% DIV 3
1290 f%=-3*g%
1300 r%=f%
1310 f%=r%+4*g%+16*b%
1320 IF i%>4 f%=f%+15:i%=i% MOD 4
1330 i%=64*i%
1340 GCOL f% TINT i%
1350 c%=ct%(f%+i%)
1360 ENDP
1370 :
1380 DATA 0,4,16,20,32,36,48,52,64,68,80,84,96,100,112,116
1390 DATA 8,12,24,28,40,44,56,60,72,76,88,92,104,108,120,124
1400 DATA 128,132,144,148,160,164,176,180,192,196,208,212,224,228,240,244
1410 DATA 136,140,152,156,168,172,184,188,200,204,216,220,232,236,248,252
1420 DATA 1,5,17,21,33,37,49,53,65,69,81,85,97,101,113,117
1430 DATA 9,13,25,29,41,45,57,61,73,77,89,93,105,109,121,125
1440 DATA 129,133,145,149,161,165,177,181,193,197,209,213,225,229,241,245
1450 DATA 137,141,153,157,169,173,185,189,201,205,217,221,233,237,249,253
1460 DATA 2,6,18,22,34,38,50,54,66,70,82,86,98,102,114,118
1470 DATA 10,14,26,30,42,46,58,62,74,78,90,94,106,110,122,126
1480 DATA 130,134,146,150,162,166,178,182,194,198,210,214,226,230,242,246
1490 DATA 138,142,154,158,170,174,186,190,202,206,218,222,234,238,250,254
1500 DATA 3,7,19,23,35,39,51,55,67,71,83,87,99,103,115,119
1510 DATA 11,15,27,31,43,47,59,63,75,79,91,95,107,111,123,127
1520 DATA 131,135,147,151,163,167,179,183,195,199,211,215,227,231,243,247
1530 DATA 139,143,155,159,171,175,187,191,203,207,219,223,235,239,251,255

```

Listing 6 - Wierdo

```

10 REM >Wierdo (Info6)
20 REM for Jan Vibe
30 REM for 32-bit machines only
40 REM (c) BAU June 1992
50 :
60 MODE 137
70 MODE 9
80 OFF
90 ORIGIN 640,512
100 a1%=1
110 s2%=2
120 p%=0
130 k%=2
140 DIM a%(k%,4),x%(k%),y%(k%),px%(k%),py%(k%),f1%,f2%
150 FOR n%=1 TO 15
160 COLOUR n%,16*n%,0,2*n%+78
170 f1%(n%)=1+(15-n%)/20
180 NEXT
190 FOR n%=0 TO 2
200 FOR m%=1 TO 5
210 x%(m%+5*n%)=4*n%+4
220 NEXT
230 NEXT
240 ON ERROR GOTO 600
250 REPEAT
260 FOR n%=1 TO k%
270 FOR m%=1 TO 4
280 a%(n%,m%)=RND(5)+3
290 NEXT
300 NEXT
310 FOR n%=1 TO 360
320 WAIT
330 SYS "OS_Byte",112,a1%
340 SYS "OS_Byte",113,s2%
350 CLS
360 SWAP a1%,s2%
370 p%=p% MOD 15+1
380 FOR m%=1 TO k%
390 x%(m%)=500*SINRAD(a%(m%,1)*n%)*COSRAD(a%(m%,2)*n%)
400 px%(m%,p%)=x%(m%)
410 y%(m%)=400*SINRAD(a%(m%,3)*n%)*COSRAD(a%(m%,4)*n%)
420 py%(m%,p%)=y%(m%)
430 NEXT
440 FOR m%=1 TO 15
450 GCOL i%
460 FOR m%=1 TO k%
470 CIRCLE FILL x%(m%)*i%/15,y%(m%)*i%/15,12*(16-i%)
480 NEXT
490 NEXT
500 FOR m%=1 TO k%
510 FOR i%=1 TO 15
520 GCOL i%
530 p1%=(p%+i%-1) MOD 15+1
540 CIRCLE FILL px%(m%,p1%)*f1%(i%),py%(m%,p1%)*f2%(i%),z%(i%)
550 NEXT
560 NEXT
570 NEXT
580 UNTIL FALSE
590 :
600 SYS "OS_Byte",112,a1%
610 REPORT
620 PRINT" at line "STR$BRL
630 ON
640 END

```


Listing 7 - Graph+

```

10 REM > !RunImage (Graph2)
20 REM by Mike Curnow
41 REM Line and Symbol extensions by
David Waters
1650 IF bar% THEN PROCsbar2 ELSE IF ln%
(gr%)>0 PROCWout(0)
1671 IF NOT bar% PROCdsymbol
2110 DEFPROCgraph:LOCAL x,y
2120 x=adx%+xd%:y=ady%+yd%:ysd
2130 CASE ln%(gr%) OF
2140 WHEN 0:REM no line
2150 WHEN 1:IF first% THEN PROCphdr(nxy
%(gr%),adx%,ady%,axm%,aym%,-1,0,64,0):PR
OCpthm(x,y):ELSE PROCpthd(x,y):REM segme
nted line
2160 WHEN 2:XL(P%)=x:YL(P%)=y:IF P%=nxy
%(gr%):PROCfit(adx%,ady%,axm%,aym%):PROC
phdr(2,adx%,ady%,axm%,aym%,-1,0,64,0):PR
OCpthm(xstart,ystart):PROCpthd(xend,yend
):REM least-squares fit
2161 ENDCASE
2950 x$()="" :sym%()=0:ln%()=1
3721 WHEN "LINE":ln%(gr%)=yd
3722 WHEN "SYMBOL":sym%(gr%)=yd
3750 OTHERWISE:2%=FALSE:n%+=1:IF gr%=0
gr%:1:sym%(1)=sym%(0):ln%(1)=ln%(0)
4720 DEFPROCgraph:LOCAL x,y
4721 x=axo%+(xd-xlo):x=y=ayo%+(yd-ylo)
*ys
4730 CASE ln%(gr%) OF
4731 WHEN 0:MOVE x,y:PROCsymbol(sym%(gr
%),x,y)
4732 WHEN 1:IF first% THEN MOVE x,y:PRO
Csymbol(sym%(gr%),x,y) ELSE DRAW x,y:PRO
Csymbol(sym%(gr%),x,y)
4733 WHEN 2:MOVE x,y:PROCsymbol(sym%(gr
%),x,y):XL(P%)=x:YL(P%)=y:IF P%=nxy%(gr%)
) PROCfit(axo%,ayo%,axo%+gx%,ayo%+gy%):L
INE xstart,ystart,xend,yend
4734 ENDCASE
6211 DIM sym%(10),ln%(10),XL(Maxdata),Y
L(Maxdata),cf(30),sf(30)
6212 FOR I%=1 TO 16:cf(I%)=COS(I%*PI/8)
:sf(I%)=SIN(I%*PI/8):NEXT
7390 :
7400 DEFPROCsymbol(n%,x,y):LOCAL s():DI
M s(3)
7410 s(1)=(gx%+gy%)/200:s(2)=s(1)/1.4:s
(3)=s(1)/1.2
7420 CASE n% OF
7430 WHEN 1:MOVE x-s(1),y-s(1):SOR(3):D
RAWBY s(1),s(1):SOR(3):DRAWBY s(1),-s(1)
*SQR(3):DRAWBY -2*s(1),0:MOVEBY s(1),s(1)
/SQR(3)
7440 WHEN 2:RECTANGLE x-s(2),y-s(2),2*s
(2),2*s(2):MOVEBY s(2),s(2)
7450 WHEN 3:CIRCLE x,y,s(3):MOVEBY -s(3
),0
7460 WHEN 4:MOVE x-s(1),y-s(1):SOR(3):D
RAWBY s(1),s(1):SOR(3):PLOT81,s(1),-s(1)
*SQR(3):MOVE x,y
7470 WHEN 5:RECTANGLE FILL x-s(2),y-s(2
),2*s(2),2*s(2):MOVE x,y
7480 WHEN 6:CIRCLE FILL x,y,s(3):MOVE x
,y
7490 ENDCASE
7500 ENDPROC
7510 :
7520 DEFPROCdsymbol:LOCAL x,y,I%,s():DI
M s(3)
7530 d%:=0:s(1)=(vx+vy)*180*256/200:s(2)
=s(1)/1.4:s(3)=s(1)/1.2
7540 FOR gr%=1 TO ng%
7550 FOR P%=1 TO nxy%(gr%)
7560 x=X(d%)+xlo:y=Y(d%)-ylo:d%+=1
7570 x=adx%+xd%:y=ady%+yd%:ysd
7580 CASE sym%(gr%) OF
7590 WHEN 0:REM no symbols
7600 WHEN 1:PROCphdr(4,adx%,ady%,axm%,a
ym%,-1,0,64,0):PROCpthm(x-s(1),y-s(1)/SQ
R(3)):PROCpthd(x,y+2*s(1)/SOR(3)):PROCpth
d(x+s(1),y-s(1)/SOR(3)):PROCpthd(x-s(1)
,y-s(1)/SOR(3)):PROCWout(0):REM open tri
angles
7610 WHEN 2:PROCphdr(5,adx%,ady%,axm%,a
ym%,-1,0,64,0):PROCpthm(x-s(2),y-s(2)):P
ROCpthd(x-s(2),y+s(2)):PROCpthd(x+s(2),y
-s(2)):PROCpthd(x+s(2),y-s(2)):PROCpthd(
x-s(2),y-s(2)):PROCWout(0):REM open squa
res
7620 WHEN 3:PROCphdr(17,adx%,ady%,axm%,
aym%,-1,0,64,0):PROCpthm(x+s(3),y):FOR I
%=1 TO 16:PROCpthd(x+s(3)*cf(I%),y+s(3
)*sf(I%)):NEXT:PROCWout(0):REM open "circl
es"
7630 WHEN 4:PROCphdr(4,adx%,ady%,axm%,a
ym%,0,0,64,0):PROCpthm(x-s(1),y-s(1)/SOR
(3)):PROCpthd(x,y+2*s(1)/SOR(3)):PROCpth
d(x+s(1),y-s(1)/SOR(3)):PROCpthd(x-s(1)
,y-s(1)/SOR(3)):PROCWout(0):REM filled tri
angles
7640 WHEN 5:PROCphdr(5,adx%,ady%,axm%,a
ym%,0,0,64,0):PROCpthm(x-s(2),y-s(2)):PR
OCpthd(x-s(2),y+s(2)):PROCpthd(x+s(2),y
-s(2)):PROCpthd(x+s(2),y-s(2)):PROCpthd(
x-s(2),y-s(2)):PROCWout(0):REM filled squa
res
7650 WHEN 6:PROCphdr(17,adx%,ady%,axm%,
aym%,0,0,64,0):PROCpthm(x+s(3),y):FOR I
%=1 TO 16:PROCpthd(x+s(3)*cf(I%),y+s(3
)*sf(I%)):NEXT:PROCWout(0):REM filled "
circles"
7660 ENDCASE
7670 NEXT
7680 NEXT
7690 ENDPROC

```

```

7700 :
7710 DEFPROCfit(x0,y0,x1,y1):LOCAL I%,x
m,ym,num,denom,xi,yi,m:xm=0:ym=0
7720 FOR I%=1 TO nxy%(gr%):xm=xm+XL(I%)
:ym=ym+YL(I%):NEXT
7730 xm=xm/nxy%(gr%):ym=ym/nxy%(gr%)
7740 num=0:denom=0:FOR I%=1 TO nxy%(gr%
):num=num+(XL(I%)-xm)*(YL(I%)-ym):denom=
denom+(XL(I%)-xm)*(XL(I%)-xm):NEXT
7750 m=num/denom
7760 REM Find intersections with bounda
ries (left, right, bottom, top)
7770 xstart=0:ystart=0:xend=0:yend=0
7780 yi=ym+m*(x0-xm):IF yi>y0 AND yi<=
y1 THEN xstart=x0:ystart=yi
7790 yi=ym+m*(x1-xm)
7800 IF yi>y0 AND yi<=y1 THEN
7810 IF xstart=0 AND ystart=0 THEN xsta
rt=x1:ystart=yi ELSE xend=x1:yend=yi
7820 ENDFIT
7830 xi=(y0-ym)/m+xm
7840 IF xi>x0 AND xi<=x1 THEN
7850 IF xstart=0 AND ystart=0 THEN xsta
rt=xi:ystart=y0 ELSE xend=xi:yend=y0
7860 ENDFIT
7870 xi=(y1-ym)/m+xm
7880 IF xi>x0 AND xi<=x1 THEN xend=xi:yi
=y1
7890 ENDPROC

```

Listing 8 - SquashS

```

10 REM >SquashS (Info8)
20 REM By Brian Cooke
30 REM For RiscOS 3 only
40 REM (C) BAU June 1992
50 :
60 ON ERROR CLOSE #0:PRINTREPORT$;" a
t line ";ERL:END
70 InSize=1024
80 OutSize=1024
90 PROCcode
100 SYS "OS_File",10,"%SquashUtil",&F
A,.code,0%
110 SYS "OS_Module",11,code,0%-code
120 END
130 :
140 DEF PROCcode
150 wp_next=0
160 Input=FNwp(4)
170 Work=FNwp(4)
180 InputSize=FNwp(4)
190 Handle=FNwp(4)
200 attr=FNwp(4)
210 FileName=FNwp(4)
220 Output=FNwp(4)
230 time=FNwp(8)
240 RMA_SIZE=wp_next
250 :
260 DIM code $8000
270 wp=12
280 sp=13
290 link=14
300 pc=15
310 FOR pass=4 TO 6 STEP 2:P%=0:O%=cod
e
320 [OPT pass
330 EQU0 0
340 EQU0 Init_Code
350 EQU0 Final_Code
360 EQU0 0
370 EQU0 Title_String
380 EQU0 Help_String
390 EQU0 0
400 EQU0 %101111111111000000
410 EQU0 SWI_Handler
420 EQU0 SWI_Names
430 EQU0 0
440 :
450 .Title_String
460 EQU0 "SquashUtils"
470 EQU0 0
480 :
490 .Help_String
500 EQU0 "Squash Util"
510 EQU0 9
520 EQU0 "0.02 (27 Mar 1992) Brian
Cooke"
530 EQU0 0
540 ALIGN
550 .SWI_Names
560 EQU0 "Squashed"
570 EQU0 0
580 EQU0 "Load"
590 EQU0 0
600 EQU0 "Info"
610 EQU0 0
620 EQU0 "Save"
630 EQU0 0
640 EQU0 0
650 :
660 ALIGN
670 :
680 .Init_Code
690 STMPD (sp)!,(R1-R4,link)
700 MOV R0,#6
710 MOV R3,RMA_SIZE
720 SWI "XOS_Module"
730 BVS no_init
740 STR R2,[R12]
750 .no_init
760 LDMFD (sp)!,(R1-R4,pc)
770 :
780 .Final_Code
790 STMPD (sp)!,(R1-R4,link)
800 LDR wp,[R12]
810 MOV R0,#7
820 MOV R2,wp
830 SWI "XOS_Module"

```

```

840 LDMFD (sp)!,(R1-R4,pc)
850 :
860 .SWI_Handler
870 LDR wp,[R12]
880 CMP R11,#(eojt-jt)/4
890 ADDCC pc,pc,R11,LSL #2
900 B Unknown_SWI
910 .jt
920 B SWI_Load
930 B SWI_Info
940 B SWI_Save
950 .eojt
960 .Unknown_SWI
970 ADR R0,unknown_error
980 ORRS pc,link,#1<<28
990 .unknown_error
1000 EQU0 &1E6
1010 EQU0 "Unknown squash operation"
1020 EQU0 0
1030 ALIGN
1040 :
1050 .Exit_Error
1060 LDMFD (sp)!,(R1-R11,link)
1070 ORRS pc,link,#1<<28
1080 :
1090 .OpenFile
1100 :R0->file
1110 STMPD (sp)!,(R1-R11,link)
1120 :
1130 MOV R1,#0
1140 STR R1,[wp,#Input]
1150 STR R1,[wp,#Work]
1160 STR R1,[wp,#Handle]
1170 :
1180 MOV R1,R0
1190 MOV R0,#20
1200 SWI "XOS_File"
1210 BVS ExitOpen
1220 CMP R0,#1
1230 BEQ IsFile
1240 :
1250 MOV R2,R0
1260 MOV R0,R19
1270 SWI "XOS_File"
1280 B ExitOpen
1290 .SquashHead
1300 EQU0 "SQSH"
1310 .SquashType
1320 EQU0 &FCA
1330 .IsFile
1340 LDR R0,SquashType
1350 CMP R6,R0
1360 BEQ IsSquash
1370 :
1380 .NotSquash
1390 ADR R0,NotSquashErr
1400 B Exit_Error
1410 .NotSquashErr
1420 EQU0 256
1430 EQU0 "Not a squashed file"
1440 EQU0 0
1450 ALIGN
1460 .IsSquash
1470 STR R5,[wp,#attr]
1480 MOV R0,#6
1490 MOV R3,#InSize
1500 SWI "XOS_Module"
1510 BVS ExitOpen
1520 STR R2,[wp,#Input]
1530 :
1540 MOV R0,#&40
1550 SWI "XOS_Find"
1560 BVS ExitOpen
1570 CMP R0,#0
1580 BLEQ UnClaim
1590 BEQ NotSquash
1600 STR R0,[wp,#Handle]
1610 :
1620 LDR R0,[wp,#Input]
1630 MOV R1,#20
1640 BL GetBytes
1650 BLVS UnClaim
1660 BVS ExitOpen
1670 :
1680 LDR R9,[wp,#Input]
1690 LDR R0,SquashHead
1700 LDR R1,[R9,#0]
1710 CMP R0,R1
1720 BEQ ExitOpen
1730 :
1740 BL UnClaim
1750 ADR R0,NoHeaderErr
1760 B Exit_Error
1770 .NoHeaderErr
1780 EQU0 256
1790 EQU0 "Unrecognised squash file"
1800 EQU0 0
1810 ALIGN
1820 :
1830 .ExitOpen
1840 LDMFD (sp)!,(R1-R11,pc)
1850 :
1860 .SWI_Info
1870 :R0->filename
1880 STMPD (sp)!,(R1,R7-R11,link)
1890 BL OpenFile
1900 BVS ExitInfo
1910 :
1920 LDR R9,[wp,#Input]
1930 LDR R2,[R9,#0]
1940 LDR R4,[R9,#12]
1950 LDR R4,[R9,#4]
1960 LDR R5,[wp,#attr]
1970 LDR R6,TestMask
1980 AND R0,R2,R6
1990 CMP R0,R6
2000 MYNNE R6,#NOT -1
2010 LDREQ R6,TypeMask
2020 ANDEQ R6,R2,R6

```

```

2030 MOVEQ R6,R6,LSR #8
2040 :
2050 MOV R0,#1
2060 .ExitInfo
2070 BL UnClaim
2080 :
2090 LDMFD (sp)!,(R1,R7-R11,pc)
2100 .TestMask
2110 EQU0 &FFF00000
2120 .TypeMask
2130 EQU0 &000FFF00
2140 :
2150 .SWI_Load
2160 :R0->filename,[R1=address]
2170 STMPD (sp)!,(R1-R11,link)
2180 :
2190 BL OpenFile
2200 BVS ExitLoad
2210 :
2220 LDR R9,[wp,#Input]
2230 MOV R4,R1
2240 LDREQ R4,[R9,#8]
2250 :
2260 MOV R0,#1000
2270 MOV R1,#InSize
2280 SWI "XSquash-Decompress"
2290 MOV R3,R0
2300 MOV R0,#6
2310 SWI "XOS_Module"
2320 BVS ExitLoad
2330 STR R2,[wp,#Work]
2340 :
2350 LDR R5,[R9,#4]
2360 MOV R3,R0 ; (unused, turned in
to bytes)
2370 MOV R0,#0 ; @start
2380 .DeLoop
2390 CMP R3,#0
2400 BEQ NoShuffle
2410 LDR R1,[wp,#Input]
2420 ADD R2,R1,#InSize
2430 SUB R2,R2,R3
2440 MOV R9,R3
2450 .shuffle
2460 LDRB R0,[R2],#1
2470 STRB R0,[R1],#1
2480 SUBS R9,R9,#1
2490 BNE shuffle
2500 .NoShuffle
2510 LDR R0,[wp,#Input]
2520 ADD R0,R0,R3
2530 RSB R1,R3,#InSize
2540 BL GetBytes \ (R0=notgot)
2550 MOV R9,R0
2560 RSB R3,R0,#InSize
2570 :
2580 MOV R0,R0
2590 ORREQ R0,R0,#%10
2600 :
2610 \ R0 = start OR (continue<<1)
2620 LDR R1,[wp,#Work]
2630 LDR R2,[wp,#Input]
2640 \ R3 = bytes (=unused on exit)
2650 \ R4 = output (updated)
2660 \ R5 = size left (updated)
2670 SWI "XSquash-Decompress"
2680 BLVS UnClaim
2690 BVS Exit_Error
2700 :
2710 MOV R8,#1
2720 :
2730 CMP R9,#0
2740 BEQ DeLoop
2750 :
2760 .ExitLoad
2770 BL UnClaim
2780 :
2790 LDMFD (sp)!,(R1-R11,pc)
2800 :
2810 .GetBytes
2820 STMPD (sp)!,(R1-R4,link)
2830 MOV R3,R1
2840 MOV R2,R0
2850 LDR R1,[wp,#Handle]
2860 MOV R0,#4
2870 SWI "XOS_GBPB"
2880 MOV R0,R3
2890 LDMFD (sp)!,(R1-R4,pc)
2900 :
2910 .UnClaim
2920 STMPD (sp)!,(R0-R2,link)
2930 :
2940 MOV R0,#7
2950 LDR R2,[wp,#Input]
2960 CMP R2,#0
2970 SWINE "XOS_Module"
2980 :
2990 MOV R0,#7
3000 LDR R2,[wp,#Work]
3010 CMP R2,#0
3020 SWINE "XOS_Module"
3030 :
3040 MOV R0,#0
3050 LDR R1,[wp,#Handle]
3060 CMP R1,#0
3070 SWINE "XOS_Find"
3080 :
3090 LDMFD (sp)!,(R0-R2,pc)
3100 :
3110 .SWI_Save
3120 :R0->filename R1=start R2=end R3=
>filetype or 0
3130 STMPD (sp)!,(R1-R11,link)
3140 :
3150 SUBS R2,R2,R1
3160 BGT mem_ok
3170 :
3180 ADR R0,BadSaveErr
3190 B Exit_Error

```




```

3200 .BadSaveErr
3210 EQUD 220
3220 EQUUS "Bad parameters for 'Save'"
3230 EQUUS 0
3240 :
3250 .mem_ok STR R0,[w,#FileName]
3260 STR R1,[w,#Input]
3270 STR R2,[w,#InputSize]
3280 STR R3,[w,#Attr]
3290 :
3300 MOV R1,#0
3310 STR R1,[w,#Output]
3320 STR R1,[w,#Work]
3330 STR R1,[w,#Handle]
3340 :
3350 MOV R0,#1000
3360 MOV R1,R2
3370 SWI "XSquash_Compress"
3380 MOV R3,R0
3390 MOV R0,#6
3400 SWI "XOS_Module"
3410 BVS ExitSave
3420 STR R2,[w,#Work]
3430 :
3440 MOV R0,#6
3450 MOV R3,#OutputSize
3460 SWI "XOS_Module"
3470 BVS ExitSave
3480 STR R2,[w,#Output]
3490 :
3500 MOV R0,#11
3510 LDR R1,[w,#FileName]
3520 LDR R2,[w,#SquashType]
3530 MOV R4,#0
3540 MOV R5,#0
3550 SWI "XOS_File"
3560 BVS ExitSave
3570 :
3580 MOV R0,#c0
3590 LDR R1,[w,#FileName]
3600 SWI "XOS_Find"
3610 BVS ExitSave
3620 STR R0,[w,#Handle]
3630 :
3640 LDR R1,[w,#Attr]
3650 CMP R1,#0
3660 LDREQ R2,[w,#Input]
3670 MOVEQ R3,R2
3680 BEQ writeheader
3690 :
3700 LDR R2,[R1]
3710 BIC R0,R2,#cFF0
3720 BICS R0,R0,#c00F
3730 BEQ r2istype
3740 MOV R0,#31
3750 SWI "XOS_FSControl"
3760 BVS ExitSave
3770 .r2istype
3780 MOV R0,#3
3790 STR R0,[w,#time]
3800 MOV R0,#14
3810 ADD R1,w,#time+3
3820 SWI "XOS_Word"
3830 LDR R0,[w,#time]
3840 ORR R2,R0,R2,LSL #8
3850 ORR R2,R2,#cFFF00000
3860 ORR R2,R2,#c00F00000
3870 LDR R3,[w,#time+4]
3880 :
3890 .writeheader
3900 LDR R0,SquashHead
3910 LDR R1,[w,#InputSize]
3920 MOV R4,#0
3930 LDR R9,[w,#Output]
3940 STMIA R9,(R0-R4)
3950 MOV R0,#20
3960 BL WriteBytes
3970 BVS ExitSave
3980 :
3990 LDR R1,[w,#Work]
4000 LDR R2,[w,#Input]
4010 LDR R3,[w,#InputSize]
4020 MOV R9,#0
4030 .CompLoop
4040 MOV R0,R9
4050 LDR R4,[w,#Output]
4060 MOV R5,#OutputSize
4070 SWI "XSquash_Compress"
4080 BVS ExitSave
4090 MOV R9,R0
4100 RSB R0,R5,#OutputSize
4110 BL WriteBytes
4120 BVS ExitSave
4130 CMP R9,#0
4140 MOVNE R9,#1
4150 BNE CompLoop
4160 :
4170 .ExitSave
4180 BL UnClaimSave
4190 :
4200 LDMFD (sp)!,(R1-R1,pc)
4210 :
4220 .WriteBytes
4230 STMPD (sp)!,(R0-R3,link)
4240 :
4250 MOV R3,R0
4260 MOV R0,#2
4270 LDR R1,[w,#Handle]
4280 LDR R2,[w,#Output]
4290 SWI "XOS_GBPB"
4300 :
4310 LDMFD (sp)!,(R0-R3,pc)
4320 :
4330 .UnClaimSave
4340 STMPD (sp)!,(R0-R2,link)
4350 :
4360 MOV R0,#7
4370 LDR R2,[w,#Output]
4380 CMP R2,#0

```

```

4390 SWINE "XOS_Module"
4400 :
4410 MOV R0,#7
4420 LDR R2,[w,#Work]
4430 CMP R2,#0
4440 SWINE "XOS_Module"
4450 :
4460 MOV R0,#0
4470 LDR R1,[w,#Handle]
4480 CMP R1,#0
4490 SWINE "XOS_Find"
4500 :
4510 LDMFD (sp)!,(R0-R2,pc)
4520 :
4530 ]NEXT
4540 ENDPROC
4550 :
4560 DEF FNwp(size)
4570 wp_next+=size
4580 =wp_next-size

```

Listing 9 - CompDemo

```

10 REM >CompDemo (Info0)
20 REM By Brian Cooke
30 REM For RiscOS 3 only
40 REM (C) BAU June 1992
50 :
60 ON ERROR CLOSE #0:PRINTREPORT$;" a
t line "ERL:END
70 INPUT"Original file: "in$
80 INPUT"Output file: "out$
90 output_size=256
100 SYS "OS_File",5,in$,TO type,,load,
exec,length
110 SYS "Squash_Compress",%1000,length
TO ws_size
120 DIM space length,ws_size,output
output_size
130 SYS "OS_File",&FF,in$,space
140 PRINT" input"," Status","
Unused"," Packed"," out/in"
150 input=space
160 togo=length
170 start=0
180 SYS "OS_File",11,out$,&FCA,,0,0
190 out=OPENUP(out$)
200 $output="SQSH"
210 output$=length
220 output$=load
230 output$=exec
240 output$=0
250 SYS "OS_GBPB",2,out,output,20
260 packed=0
270 REPEAT
280 SYS "Squash_Compress",start,ws,inp
ut,togo,output,output_size TO status,,in
put,togo,,unused
290 SYS "OS_GBPB",2,out,output,output_
size-unused
300 packed+=(output_size-unused)
310 PRINT input-space,status,unused,pa
cked,(packed*100) DIV (input-space);%"
320 start=1
330 UNTIL status=0
340 CLOSE #out

```

Listing 10 - CDown

```

10 REM >CDown (Info10)
20 REM Countdown numbers game solver
30 REM by Richard May
40 REM for all machines
50 REM (c) BAU June 1992
60 :
70 MODE 7
80 VDU 23;:c40A;0;0;0;
90 PROCcdown
100 DIM num$(6)
110 DIM n$(6),o$(4),s$(5,1)
120 FOR i%=1 TO 4
130 READ o$(i)
140 NEXT
150 *FX 15,1
160 REPEAT
170 CLS
180 PROCinit
190 PRINT"Quick or Full search (q/f)?
";
200 REPEAT
210 a$=GET$
220 UNTIL INSTR("QqFf",a$)>0
230 PRINTa$
240 w=(INSTR("Ff",a$)=0)
250 TIME=0
260 tm=0
270 PRINT"Computing method: "
280 FOR x%=1 TO 3
290 PROCm1
300 IF b%=0 THEN x%=3 ELSE PROCm2
310 NEXT
320 a%=5
330 CLS
340 PRINT"Nearest method: ";b%; away.
""Time taken:"
350 t%=tm% DIV 100
360 IF t%<61 THEN PRINT;t%;" second";
IF t%>1 AND t%<61 THEN PRINT;"s ELSE PRI
NT
370 IF t%>60 THEN PRINT;t% DIV 60;" ";
t% MOD 60;" minutes"
380 PRINT
390 FOR i%=1 TO 5
400 PRINT FNop(s$(i,0));
410 NEXT
420 PRINT"SPC(3);"Press SPACE to conti
nue";
430 *FX 15,1
440 REPEAT UNTIL GET=32

```

```

450 UNTIL FALSE
460 :
470 DEF PROCquot
480 PROCread
490 q%=INT(t%/n%+0.5)
500 s%=0
510 PRINT
520 IF x%=2 THEN q%=q%-1 ELSE IF x%=3
THEN q%=q%+1
530 IF q%<2 THEN c$="":ENDPROC
540 c$=FNfind(q%)
550 PRINT FNop(c$);
560 ENDPROC
570 :
580 DEF FNquot2
590 IF c$<>" THEN PROCdel(c$):=FNop(c
$)
600 =""
610 :
620 DEF PROCm1
630 PROCquot
640 IF q%>1 THEN PRINT FNop(STR$(n%)+
**STR$(EVAL(c$)));:n%=n%-EVAL(c$)
650 IF q%=0 THEN 730
660 IF b%=0 THEN ENDPROC
670 r%=ABS(t%-n%)
680 IF r%=0 THEN 730
690 b%=FNfind(r%)
700 IF b%<>" THEN PRINT FNop(b%); ELSE
E 730
710 IF n%>t% THEN PRINT FNop(STR$(n%)+
**STR$(EVAL(b%))); ELSE PRINT FNop(STR
$(n%)+**STR$(EVAL(b%)));
720 n%=n%+EVAL(b%)*SGN(t%-n%)
730 IF b%=0 THEN x%=3
740 ENDPROC
750 :
760 DEF PROCm2
770 FOR z%=1 TO 3
780 a%=0
790 PRINT
800 PROCread
810 IF q%<2 OR c$=" THEN 960
820 IF EVAL(c$)<q% THEN 960
830 PRINT FNquot2;
840 r%=ABS(t%-EVAL("("+c$+*"))+STR$(n%
)))
850 r%=INT(r%/q%+0.5)
860 IF z%=2 THEN r%=r%-1 ELSE IF z%=3
THEN r%=r%+1
870 IF r%=0 THEN 960 ELSE r%=ABS(r%)
880 d%=FNfind(r%)
890 IF d%=0 THEN 960
900 PRINT FNop(d%);
910 IF n%>q% THEN PRINT FNop(STR$(n%
%)+**STR$(r%));FNop(STR$(n%-r%)+**ST
R$(q%));:n%=(n%-r%)*q% ELSE PRINT FNop(S
TR$(n%)+**STR$(r%));FNop(STR$(n%+r%)+
**STR$(q%));:n%=(n%+r%)*q%
920 r%=ABS(t%-n%);IF r%=0 THEN 960
930 b%=FNfind(r%);IF b%<>" THEN 960
940 PRINT FNop(b%);
950 IF n%>t% THEN PRINT FNop(STR$(n%)+
**STR$(EVAL(b%)));:n%=n%-EVAL(b%) ELSE
PRINT FNop(STR$(n%)+**STR$(EVAL(b%)))
;n%=n%-EVAL(b%)
960 IF b%=0 THEN x%=3:x%=3
970 NEXT
980 ENDPROC
990 :
1000 DEF FNfind(i%)
1010 d%=i%
1020 a$=""
1030 IF FNnos=0 THEN 1770
1040 FOR u%=2 TO 6
1050 IF ABS(1%-n%(u%))<d% THEN a$=STR$(
n%(u%));d%=ABS(1%-n%(u%))
1060 IF d%=0 THEN n%(u%)=0:u%=6
1070 NEXT
1080 IF d%=0 THEN a$
1090 IF FNnos<2 THEN 1770
1100 FOR k%=1704
1110 FOR u%=2T06
1120 FOR j%=2T06
1130 IF u%=j% OR n%(u%)=0 OR n%(j%)=0 T
HEN 1190
1140 n$=STR$(n%(u%))+o$(k%)+STR$(n%(j%
))
1150 n=EVAL(n$)
1160 IF n<>INT(n) THEN 1190
1170 IF ABS(1%-n)<d% THEN a$=n$:d%=ABS(
1%-n)
1180 IF d%=0 THEN n%(u%)=0:n%(j%)=0:j%=
6:u%=6:k%=4
1190 NEXT
1200 NEXT
1210 NEXT
1220 IF d%=0 THEN a$
1230 IF FNnos<3 THEN 1770
1240 FOR h%=1704
1250 FOR u%=1704
1260 FOR j%=2T06
1270 FOR u%=2T06
1280 FOR j%=2T06
1290 IF u%=j% OR u%=1% OR l%=j% TH
EN 1300
1300 IF n%(u%)=0 OR n%(j%)=0 OR n%
(1%)=0 THEN 1450
1310 n$=STR$(n%(u%))+o$(k%)+STR$(n
%(j%))+o$(h%)+STR$(n%(1%))
1320 n=EVAL(n$)
1330 IF n<>INT(n) THEN 1350
1340 IF ABS(1%-n)<d% THEN a$=n$:d%
=ABS(1%-n)
1350 n$="("+STR$(n%(u%))+o$(k%)+ST
R$(n%(j%))+**STR$(h%)+STR$(n%(1%))
1360 n=EVAL(n$)
1370 IF n<>INT(n) THEN 1390
1380 IF ABS(1%-n)<d% THEN a$=n$:d%
=ABS(1%-n)
1390 IF k%=4 AND n%(j%)=n%(1%) THE
N 1440
1400 n$=STR$(n%(u%))+o$(k%)+**ST
R$(n%(j%))+o$(h%)+STR$(n%(1%))+**"
1410 n=EVAL(n$)
1420 IF n<>INT(n) THEN 1440
1430 IF ABS(1%-n)<d% THEN a$=n$:d%
=ABS(1%-n)
1440 IF d%=0 THEN n%(u%)=0:n%(j%)=
0:n%(1%)=0:j%=6:u%=6:l%=6:k%=4:h%=4
1450 NEXT
1460 NEXT
1470 NEXT
1480 NEXT
1490 NEXT
1500 IF d%=0 THEN a$
1510 IF FNnos<4 OR w%=TRUE THEN 1770
1520 FOR h%=1 TO 4
1530 FOR k%=1 TO 4
1540 FOR g%=1 TO 4
1550 FOR l%=2 TO 6
1560 FOR u%=2 TO 6
1570 FOR j%=2 TO 6
1580 FOR o%=2 TO 6
1590 IF l%=u% OR l%=j% OR l%=o%
OR u%=j% OR u%=o% OR j%=o% THEN 1690
1600 IF n%(u%)=0 OR n%(j%)=0 OR
n%(1%)=0 OR n%(o%)=0 THEN 1690
1610 n$=STR$(n%(u%))+o$(k%)+STR$(
n%(j%))+o$(h%)+STR$(n%(1%))+o$(g%)+STR$
(n%(o%))
1620 n=EVAL(n$)
1630 IF n<>INT(n) THEN 1650
1640 IF ABS(1%-n)<d% THEN a$=n$:
d%=ABS(1%-n)
1650 n$="("+STR$(n%(u%))+o$(k%)+
STR$(n%(j%))+**STR$(h%)+STR$(n%(1%))+o$(
g%)+STR$(n%(o%))
1660 n=EVAL(n$)
1670 IF n<>INT(n) THEN 1690
1680 IF ABS(1%-n)<d% THEN a$=n$:
d%=ABS(1%-n)
1690 IF d%=0 THEN n%(u%)=0:n%(j%
)=0:n%(1%)=0:n%(o%)=0:j%=6:u%=6:l%=6:o%=
6:k%=4:h%=4:g%=4
1700 NEXT
1710 NEXT
1720 NEXT
1730 NEXT
1740 NEXT
1750 NEXT
1760 NEXT
1770 PROCdel(a$)
1780 a$
1790 :
1800 DEF PROCdel(a$)
1810 i%=0
1820 z$=""
1830 i%=i%+1
1840 IF INSTR("()*+-*/",MID$(a$,i%,1))=0
THEN z$=z$+MID$(a$,i%,1) ELSE PROCremov
e(a$(z$)):z$=""
1850 IF i%=LEN(a$) THEN 1830
1860 PROCremove(VAL(z$))
1870 ENDPROC
1880 :
1890 DEF PROCremove(u%)
1900 FOR j%=1 TO 6
1910 IF n%(j%)=u% THEN n%(j%)=0:j%=6
1920 NEXT
1930 ENDPROC
1940 :
1950 DEF PROCread
1960 FOR i%=1 TO 6
1970 n%(i%)=num$(i%)
1980 NEXT
1990 u%=0
2000 u%=0
2010 FOR i%=1 TO 6
2020 IF n%(i%)>u% THEN u%=n%(i%):n%=i%
2030 NEXT
2040 IF u%=n%(1) THEN j%=n%(1):n%(1)=n%
(n%):n%=n%(1)
2050 n%=n%(1)
2060 ENDPROC
2070 :
2080 DEF FNop(a$)
2090 LOCAL i%
2100 IF a%=0 THEN FOR i%=1 TO 5:s$(i,1
)="":NEXT
2110 IF a$="" THEN =""
2120 IF VAL(a$)=EVAL(a$) AND s%<5 THEN
=""
2130 FOR i%=1 TO LEN(a$)
2140 IF MID$(a$,i%,1)<>" THEN PRINTM
ID$(a$,i%,1); ELSE PRINT"x";
2150 NEXT
2160 PRINT"=";EVAL(a$)
2170 IF s%=5 THEN =""
2180 s%=s%+1
2190 s$(s%,1)=a$
2200 IF ABS(t%-EVAL(a$))>b% THEN =""
2210 b%=ABS(t%-EVAL(a$))
2220 FOR i%=1 TO 5
2230 s$(i,0)=s$(i,1)
2240 NEXT
2250 tm%=TIME
2260 =""
2270 :
2280 DEF PROCinit
2290 PRINT
2300 FOR i%=1 TO 6
2310 PRINT"Enter number ";i%;" ";
2320 INPUT"num$(i%)"
2330 NEXT
2340 PRINT"Enter total: ";
2350 INPUT"t%"
2360 b%=t%

```



```

2370 PRINT
2380 ENDPROC
2390 :
2400 DEF FNnos
2410 LOCAL i%,u%
2420 FOR u%=2 TO 6
2430 IF n%(u%)>0 THEN i%=i%+1

```

```

2440 NEXT
2450 :i%
2460 :
2470 DEF PROCscreen
2480 CLS
2490 VDU 31,0,1,132,157,31,39,1,156,31,
0,2,132,157,147,95

```

```

2500 PRINT STRING$(32,"I")"0 "CHR$156
2510 FOR i%=3 TO 20
2520 VDU 31,0,i%,132,157,147,255,135,3
1,35,i%,147,255,32,32,156
2530 NEXT
2540 VDU 31,0,22,132,157,31,39,22,156,3
1,0,21,132,157,147,34

```

```

2550 PRINT STRING$(32,"/");"! ";CHR$15
6
2560 VDU 28,5,19,34,4
2570 ENDPROC
2580 :
2590 DATA +,-,*,/

```

ARM PROGRAMMING

Listing 1

```

10 REM >ARM1 (ArmProg1)
20 REM By Dave Lawrence
30 REM For 32 bit machines
40 REM (C) BAU June 1992
50 :
60 DIM code 100
70 link=14
80 pc=15
90 FOR pass=0 TO 2 STEP 2

```

```

100 P%=code
110 [OPT pass
120 .shifttest
130 MOV R0,#2
140 RSB R1,R0,R0,LSL #5
150 RSB R0,R1,R0,LSL #8
160 MOV R0,R0,LSL #4
170 MOV pc,link
180 ]NEXT
190 PRINT "Press SPACE to run code";
200 IFGET
210 PRINT "R0=";USR(shifttest)

```

Listing 2

```

10 REM >ARM2 (ArmProg2)
20 REM By Dave Lawrence
30 REM For 32 bit machines
40 REM (C) BAU June 1992
50 :
60 DIM code 100
70 link=14
80 pc=15
90 FOR pass=0 TO 2 STEP 2
100 P%=code

```

```

110 [OPT pass
120 .extend
130 MOV R0,#256 -12 ; -12
in 8 bit
140 MOV R0,R0,LSL #24
150 MOV R0,R0,ASR #24
160 MOV pc,link
170 ]NEXT
180 PRINT "Press SPACE to run code";
190 IFGET
200 PRINT "R0=";USR(extend)

```

WIRED FOR SOUND

Listing 1 - Wave

```

10 REM > WaveGen1 (Sound1)
20 REM By David Radford
30 REM for Arc only
40 REM (c) BAU May 1992
50 :
60 maxlen% = 320*4
70 length% = 160
80 DIM buffer% maxlen%*256
90 DIM tb1% 256,tb2% 256
100 same% = TRUE:shaded% = FALSE
110 samplerate% = 24
120 *AUDIO ON
130 MODE 12:OFF
140 COLOUR 5,7
150 COLOUR 6,4
160 *POINTER 1
170 PROCinitcode
180 PROCdrawscreen
190 PROCdrawbuttons
200 quit% = FALSE
210 REPEAT
220 REPEAT
230 MOUSE x%,y%,b%
240 UNTIL b%<0
250 REPEAT
260 MOUSE x%,y%,b%
270 UNTIL b%<0
280 i% = FNicon(x%,y%)
290 IF i%<14 AND shaded% THEN i% = -1
300 CASE i% OF
310 WHEN 0:PROCeditwave(tb1%,688)
320 WHEN 1:PROCeditwave(tb2%,352)
330 WHEN 2,3,4,5,6:PROCsetwave(tb1%,i%
-2,688)
340 WHEN 7,8,9,10,11:PROCsetwave(tb2%,
i%-7,352)
350 WHEN 12:PROCalterlength(-1,1020)
360 WHEN 13:PROCalterlength(1,1172)
370 WHEN 14:PROCplay
380 WHEN 15:PROCsave
390 WHEN 16:PROCload
400 WHEN 17:PROCcommand
410 WHEN 18:MODE12:quit% = TRUE
420 WHEN 19:PROCnewsound
430 ENDCASE
440 UNTIL quit%
450 END
460 :
470 DEF PROCdrawscreen
480 RESTORE #0
490 REPEAT
500 READ xmin%,ymin%,xmax%,ymax%,a$
510 IF a$<"end" AND ymin%>=300 THEN
520 GCOL 0,6
530 IF a$<" " THEN RECTANGLE FILL xmin
%+2,ymin%+4,xmax%-4,ymax%-12
540 GCOL 0,5
550 RECTANGLE xmin%,ymin%,xmax%-2,ymax
%-4
560 x% = xmin%+xmax%/2-LEN(a$)*8
570 y% = ymin%+ymax%/2+14
580 MOVE x%,y%:PRINTCHR$5;a$;CHR$4;:OF
F
590 ENDIF
600 UNTIL a$="end"
610 GCOL 0,5
620 MOVE 1068,720:PRINTCHR$5;"Length:"
;CHR$4;:OFF
630 a$ = STR$length%:a$ = STRING$(4-LENa$,
CHR$32);a$
640 COLOUR 5:PRINTTAB(68,12);a$;
650 PROCsetwave(tb1%,0,688)
660 PROCsetwave(tb2%,0,352)
670 ENDPROC
680 :
690 DEF PROCdrawbuttons
700 RESTORE #0
710 REPEAT
720 READ xmin%,ymin%,xmax%,ymax%,a$
730 IF a$<"end" AND ymin%>=300 THEN
740 GCOL 0,4
750 RECTANGLE FILL xmin%+2,ymin%+4,xma
x%-4,ymax%-12
760 GCOL 0,7

```

```

770 RECTANGLE xmin%,ymin%,xmax%-2,ymax
%-4
780 x% = xmin%+xmax%/2-LEN(a$)*8
790 y% = ymin%+ymax%/2+14
800 MOVE x%,y%:PRINTCHR$5;a$;CHR$4;:OF
F
810 ENDIF
820 UNTIL a$="end"
830 ENDPROC
840 :
850 DEF FNicon(x%,y%)
860 RESTORE #0:i%=-1:j%=0
870 REPEAT
880 READ xmin%,ymin%,xmax%,ymax%,a$
890 IF x%>=xmin% AND x%<=xmax% AND y%>=
ymin% AND y%<=ymax% THEN i% = j
%
900 j% = i%+1
910 UNTIL a$="end" OR i%<-1
920 :i%
930 :
940 DATA 32,688,258*2,67*4,""
950 DATA 32,352,258*2,67*4,""
960 DATA 700,900,250,56,"Clear"
970 DATA 700,848,250,56,"Sine wave"
980 DATA 700,796,250,56,"Triangle wave"
"
990 DATA 700,744,250,56,"Square wave"
1000 DATA 700,692,250,56,"Saw-tooth wav
e"
1010 DATA 700,640,250,56,"Clear"
1020 DATA 700,512,250,56,"Sine wave"
1030 DATA 700,460,250,56,"Triangle wave"
"
1040 DATA 700,408,250,56,"Square wave"
1050 DATA 700,356,250,56,"Saw-tooth wav
e"
1060 DATA 1020,600,48,48,"<"
1070 DATA 1172,600,48,48,">"
1080 DATA 0,188,240,56,"Play sound"
1090 DATA 240,188,240,56,"Save sound"
1100 DATA 480,188,240,56,"Load sound"
1110 DATA 720,188,80,56,"*"
1120 DATA 800,188,240,56,"Quit"
1130 DATA 1040,188,240,56,"New sound"
1140 DATA 0,0,0,0,"end"
1150 :
1160 DEF PROCalterlength(d%,x%)
1170 TIME=0:length%+d%
1180 REPEAT
1190 MOUSE a%,b%,c%
1200 IF TIME>=30 AND (TIME MOD10)<2 THEN
length%+=d%:IF TIME>=200 d%=-SGN(d%)
1210 IF length%<2 THEN length%=2
1220 IF length%>maxlength% THEN length%
=maxlength%
1230 a$ = STR$length%:a$ = STRING$(4-LENa$,
CHR$32);a$
1240 COLOUR 5:WAIT:PRINTTAB(68,12);a$;
1250 UNTIL a%<x% OR a%>=x%+48 OR b%<600
OR b%>=600+48 OR c%<0
1260 recal% = TRUE
1270 ENDPROC
1280 :
1290 DEF PROCsmallwindow
1300 COLOUR 7:VDU 28,0,31,79,24,12
1310 COLOUR 5,128,128,128
1320 COLOUR 6,0,0,128
1330 COLOUR 1,128,0,0
1340 MOUSE OFF
1350 ENDPROC
1360 :
1370 DEF PROCfullwindow
1380 VDU 12,28,0,31,79,0
1390 IF NOT shaded% THEN
1400 COLOUR 5,7
1410 COLOUR 6,4
1420 COLOUR 1,1
1430 ELSE
1440 COLOUR 5,0
1450 COLOUR 6,0
1460 COLOUR 1,0
1470 ENDIF
1480 MOUSE ON
1490 PROCdrawbuttons
1500 ENDPROC
1510 :
1520 DEF PROCcommand

```

```

1530 LOCAL ERROR
1540 PROCsmallwindow
1550 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &";"ERR;)"
1560 REPEAT
1570 INPUT**a$
1580 OSCLI(a$)
1590 UNTIL a$=" "
1600 PROCfullwindow
1610 ENDPROC
1620 :
1630 DEF PROCrecalc
1640 IF recal% = FALSE THEN ENDPROC
1650 recal% = FALSE
1660 A% = length%
1670 B% = tb1%:C% = tb2%
1680 IF same% THEN C% = B%
1690 CALL calcsamp
1700 ENDPROC
1710 :
1720 DEF PROCsetwave(data%,type%,y%)
1730 IF data% = tb2% AND type% = 0 THEN sam
e% = TRUE ELSE IF data% = tb2% THEN same% = FA
LSE
1740 a% = 0:b% = 2:FOR T% = 0 TO 255
1750 CASE type% OF
1760 WHEN 0:data%?T% = 0
1770 WHEN 1:data%?T% = 127*SGN(RAD(T%/256
*360))
1780 WHEN 2:data%?T% = a%+b%:IF a%>=1
26 OR a%<=-127 THEN b% = -b%
1790 WHEN 3:IF T%<128 THEN data%?T% = 127
ELSE data%?T% = 128
1800 WHEN 4:data%?T% = a%+a%+1
1810 ENDCASE
1820 NEXT
1830 GCOL 0,0
1840 RECTANGLE FILL 34,y%+4,255*2,64*4
1850 GCOL 0,1
1860 LINE 34,y%+67*2,34+258*2-6,y%+67*2
1870 GCOL 0,5
1880 A% = 32:B% = y%:C% = data%:CALL drawwave
1890 recal% = TRUE
1900 ENDPROC
1910 :
1920 DEF PROCplay
1930 PROCrecalc
1940 !samplerate = samplerate%
1950 !sourceptr = buffer%
1960 IF shaded% THEN !sourceelen = length%
ELSE !sourceelen = length%*256
1970 CALL playback
1980 ENDPROC
1990 :
2000 DEF PROCeditwave(data%,y%)
2010 IF data% = tb2% THEN same% = FALSE
2020 A% = 32:B% = y%:C% = data%
2030 MOUSE RECTANGLE 34,y%+4,255*2,64*4
2040 mousex% = -1:mousey% = -1:olde% = -1
2050 REPEAT
2060 REPEAT
2070 MOUSE a%,f%,c%:a% = a% AND &FFFE:f% =
f% AND &FFFF
2080 UNTIL C% = 0 OR mousex%<0 OR mouse
y%<0
2090 IF olde%<-1 THEN olde% = e%
2100 IF mousex% = a% THEN olde% = -1
2110 mousex% = a%:mousey% = f%
2120 b% = (f%-(y%+33*4))/4
2130 IF b%<32 THEN b% = 32 ELSE IF b%<-32
THEN b% = -32
2140 val% = b%*4:IF val% = 128 THEN val% = 12
7 ELSE val% = val% AND 255
2150 e% = (a%-34)DIV2
2160 x1% = a%-2:x2% = a%+2
2170 IF olde% = -1 THEN
2180 olde% = 0
2190 data%?b% = val%
2200 e1% = e%:e2% = e%
2210 ELSE
2220 IF e%<olde% THEN e1% = olde%:e2% = e%:
y1% = val%:FOR128:y1% = data%?e1%:FOR128:x1%
= a%-(e2%-e1%)*2 ELSE e1% = e%:e2% = olde%:
y1% = val%:FOR128:y2% = data%?e2%:FOR128:x2% = a
%-(e2%-e1%)*2
2230 k% = 2*ABS(y2%-y1%)-(e2%-e1%):j% = y1%
2240 FOR T% = e1% TO e2%:data%?T% = j%:EOR1
28

```

```

2250 WHILE k%>0:j%+=SGN(y2%-y1%):k%=k%
-2*(e2%-e1%):ENDWHILE
2260 k% = k%+2*ABS(y2%-y1%):NEXT
2270 ENDF
2280 IF e1%<0 THEN x1% = a%
2290 IF e2%>255 THEN x2% = a%
2300 GCOL 0,0:RECTANGLE FILL x1%,y%+4,x
2%-x1%,255
2310 GCOL 0,1:LINE x1%,y%+4+128,x2%,y%+
4+128
2320 GCOL 0,5:CALL drawwave
2330 UNTIL C%<0
2340 MOUSE RECTANGLE 0,0,1279,1023
2350 recal% = TRUE
2360 ENDPROC
2370 :
2380 DEF PROCinitcode
2390 DIM code% 2048
2400 FOR PASS=0 TO 2 STEP 2
2410 P% = code%
2420 [OPT PASS
2430 .drawwave
2440 MOV R5,R0
2450 MOV R6,R1
2460 MOV R7,R2
2470 MOV R0,R4
2480 ADD R1,R5,#2
2490 LDRB R2,[R7],#1
2500 EOR R2,R2,#128
2510 ADD R2,R2,#4
2520 ADD R2,R2,#6
2530 SWI "OS_Plot"
2540 MOV R8,#255
2550 MOV R0,#5
2560 .drawwaveloop
2570 ADD R1,R1,#2
2580 LDRB R2,[R7],#1
2590 EOR R2,R2,#128
2600 ADD R2,R2,#4
2610 ADD R2,R2,#6
2620 SWI "OS_Plot"
2630 SUBS R8,R8,#1
2640 BNE drawwaveloop
2650 MOV PC,R14
2660 :
2670 .mainbufferptr EQU30 buffer%
2680 :
2690 .calcsamp
2700 SUB R0,R0,#1
2710 MOV R3,#255
2720 .calcsamploop1
2730 LDR R4,mainbufferptr
2740 ADD R4,R4,R3
2750 MOV R5,R0
2760 LDRB R6,[R2,R3]
2770 EOR R6,R6,#128
2780 LDRB R7,[R1,R3]
2790 EOR R7,R7,#128
2800 SUBS R8,R8,#1
2810 SUBMI R8,R7,R6
2820 MOVPL R9,#1
2830 MVNMI R9,#0
2840 MOVEQ R9,#0
2850 RSB R11,R0,R8,LSL #1
2860 :
2870 .calcsamploop2
2880 EOR R10,R7,#128
2890 STRB R10,[R4],#256
2900 CMP R11,#0
2910 BLT skipcalcsamploop3
2920 .calcsamploop3
2930 ADD R7,R7,R9
2940 SUB R11,R11,R0,LSL #1
2950 CMP R11,#0
2960 BGE calcsamploop3
2970 .skipcalcsamploop3
2980 ADD R1,R11,R8,LSL #1
2990 SUBS R5,R5,#1
3000 BNE calcsamploop2
3010 LDRB R10,[R2,R3]
3020 STRB R10,[R4]
3030 SUBS R3,R3,#1
3040 BPL calcsamploop1
3050 MOV PC,R14
3060 :
3070 .playback
3080 STMPD R131,[R14]
3090 LDR R0,sourceptr

```




```
3100 LDR R1,sourcelen
3110 ADD R1,R0,R1
3120 STR R1,sourcelen
3130 MOV R0,#0
3140 STR R0,finished
3150 MOV R0,#1
3160 MOV R1,#0
3170 LDR R2,samplerate
3180 MOV R3,#0
3190 MOV R4,#0
3200 SWI "Sound_Configure"
3210 ADR R5,oldconfig
3220 STMIA R5,(R0,R2)
3230 LDR R0,[R3,#8]
3240 STR R0,logptr
3250 ADR R0,voice
3260 MOV R1,#0
3270 SWI "Sound_InstallVoice"
3280 TEQ R1,#0
3290 ADREQ R0,error
3300 SWI "OS_GenerateError"
3310 STR R1,voiceslot
3320 MOV R0,#1
3330 SWI "XSound_AttachVoice"
3340 BVS exit
3350 TEQ R0,#0
3360 BEQ exit
3370 STR R1,oldslot
3380 MOV R0,#1
3390 MOV R1,#170
3400 MOV R2,#100
3410 MOV R3,#100
3420 SWI "XSound_Control"
3430 :
3440 .playloop
3450 SWI "XOS_ReadEscapeState"
3460 BCS exit
3470 LDR R0,finished
3480 TEQ R0,#0
3490 BEQ playloop
3500 :
3510 .exit
3520 ADR R5,oldconfig
3530 LDMIA R5,(R0,R2)
3540 MOV R1,#0
3550 MOV R3,#0
3560 MOV R4,#0
3570 SWI "XSound_Configure"
3580 LDR R1,oldslot
3590 MOV R0,#1
3600 SWI "XSound_AttachVoice"
3610 LDR R1,voiceslot
3620 SWI "XSound_RemoveVoice"
3630 MOV R0,#126
3640 SWI "OS_Byte"
3650 LDMFD R13!,(PC)
3660 :
3670 .error EQU 0
3680 EQUS "Unable to install voice gene
rator"
3690 EQU 0
3700 ALIGN
3710 :
3720 .oldconfig
3730 EQU 0
3740 EQU 0
3750 .voiceslot EQU 0
3760 .oldslot EQU 0
3770 :
3780 .voice
3790 B fill
3800 B fill
3810 B fill
3820 B gateoff
3830 LDMFD R13!,(PC)
3840 LDMFD R13!,(PC)
3850 LDMFD R13!,(PC)
3860 EQU voiceame-voice
3870 .voiceame
3880 EQUS "TestVoice"
3890 EQU 0:ALIGN
3900 :
3910 .gateoff
3920 MOV R0,#0
3930 .gateoffloop
3940 STRB R0,[R12],R11
3950 STRB R0,[R12],R11
3960 STRB R0,[R12],R11
3970 STRB R0,[R12],R11
3980 CMP R12,R10
3990 BLT gateoffloop
4000 MOV R0,#1
4010 LDMFD R13!,(PC)
4020 :
4030 .fill
4040 ADR R7,logptr
4050 LDMIA R7,(R3-R5)
4060 .fillbuffer
4070 :FOR T%=1 TO 4
4080 OPT PASS
4090 CMP R4,R5
4100 BGE endofsample
4110 LDRB R0,[R4],#1
4120 LDRB R0,[R3,R0,LSL #5]
4130 STRB R0,[R12],R11
4140 NEXT
4150 OPT PASS
4160 CMP R12,R10
4170 BLT fillbuffer
4180 STR R4,sourcptr
4190 MOV R0,#8
4200 LDMFD R13!,(PC)
4210 :
4220 .endofsample
4230 MOV R0,#0
4240 .endofsampleloop
4250 STRB R0,[R12],R11
4260 CMP R12,R10
4270 BLT endofsampleloop
4280 STR R4,sourcptr
4290 STR R4,finished
4300 MOV R0,#2
4310 LDMFD R13!,(PC)
4320 :
4330 .logptr EQU 0
4340 .sourcptr EQU buffer%
4350 .sourcelen EQU 0
4360 .sourcelen EQU maxlength%*256
4370 .finished EQU 0
4380 .samplerate EQU 0
4390 NEXT
4400 ENDPROC
4410 :
4420 DEF PROCnewsound
4430 COLOUR 5,7
4440 COLOUR 6,4
4450 COLOUR 1,1
4460 shaded%=FALSE
4470 length%=160
4480 samplerate%=24
4490 recalcm%=TRUE:PROCdrawscreen
4500 ENDPROC
4510 :
4520 DEF PROCshade
4530 shaded%=TRUE
4540 COLOUR 5,0
4550 COLOUR 6,0
4560 COLOUR 1,0
4570 recalcm%=FALSE
4580 ENDPROC
4590 :
4600 DEF PROCload
4610 LOCAL ERROR
4620 PROCsmallwindow
4630 X%=0
4640 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
4650 ok%=FALSE
4660 REPEAT
4670 INPUT "Enter filename: "f$
4680 IF f$<>" THEN
4690 X%=OPENINF$
4700 IF X%=0 THEN PRINT"Unable to open
file" ELSE PROCloadfile
4710 ENDIF
4720 UNTIL ok% OR f$=""
4730 PROCfullwindow
4740 ENDPROC
4750 :
4760 DEF PROCloadfile
4770 IF EXT#X%-1>maxlength%*256 THEN PR
INT"Not enough memory for this sample":
CLOSE#X%X%=0:ENDPROC
4780 shaded%=FALSE
4790 length%=160
4800 samplerate%=24
4810 j%=VPOS:VDU28,0,31,79,0
4820 recalcm%=TRUE:PROCdrawscreen
4830 VDU 28,0,31,79,24,31,0,j%
4840 samplerate%=BGET#X%-1
4850 length%-EXT#X%-1
4860 SYS "OS_GBPB",4,X%,buffer%,EXT#X%-
1
4870 CLOSE#X%X%=0
4880 IF (length% MOD 256)<0 OR samplera
te%<24 THEN PROCshade ELSE PROCloadtabl
e%
4890 ok%=TRUE
4900 ENDPROC
4910 :
4920 DEF PROCloadtables
4930 length%=length% DIV 256
4940 A%=buffer%B%=buffer%length%*256-
256
4950 FOR T%=0 TO 255:tbl1%?T%=A%?T%:tbl2%
?T%=B%?T%:NEXT
4960 A%=0:FOR T%=0 TO 255
```

```
4970 IF tbl2%?T%=0 THEN A%+=1
4980 NEXT
4990 IF A%=256 THEN same%=TRUE ELSE sam
e%=FALSE
5000 a$=STR$length%:a$=STRING$(4-LENa$,
CHR$(32))+a$
5010 y%=VPOS:VDU 28,0,31,79,0:COLOUR 5:
PRINTTAB(68,12);a$;
5020 VDU 28,0,31,79,24,31,0,y%:tbl2%
5030 FOR y%=352 TO 688 STEP 688-352
5040 GCOL 0,0
5050 RECTANGLE FILL 34,y%+4,255*2,64*4
5060 GCOL 0,1
5070 LINE 34,y%+67*2,34+258*2-6,y%+67*2
5080 GCOL 0,5
5090 A%=32:B%=y%:CALL drawwave:C%tbl1%
5100 NEXT
5110 recalcm%=TRUE
5120 ENDPROC
5130 :
5140 DEF PROCsave
5150 LOCAL ERROR
5160 IF shaded% THEN ENDPROC
5170 PROCsmallwindow
5180 X%=0
5190 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
5200 ok%=FALSE
5210 REPEAT
5220 INPUT "Enter filename: "f$
5230 IF f$<>" THEN
5240 X%=OPENOUTF$
5250 IF X%=0 THEN
5260 PRINT"Unable to open file"
5270 ELSE
5280 PROCrecalc
5290 BPUT #X%,samplerate%
5300 SYS "OS_GBPB",2,X%,buffer%,length%
*256
5310 CLOSE#X%X%=0
5320 SYS "OS_File",18,f$,d3C
5330 ok%=TRUE
5340 ENDIF
5350 ENDPROC
5360 UNTIL ok% OR f$=""
5370 PROCfullwindow
5380 ENDPROC
5390 :
5400 DEF PROCecho
5410 LOCAL ERROR
5420 PROCsmallwindow
5430 X%=0
5440 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
5450 ok%=FALSE
5460 REPEAT
5470 INPUT "Enter filename: "f$
5480 IF f$<>" THEN
5490 X%=OPENOUTF$
5500 IF X%=0 THEN
5510 PRINT"Unable to open file"
5520 ELSE
5530 PROCrecalc
5540 BPUT #X%,samplerate%
5550 SYS "OS_GBPB",2,X%,buffer%,length%
*256
5560 CLOSE#X%X%=0
5570 SYS "OS_File",18,f$,d3C
5580 ok%=TRUE
5590 ENDIF
5600 UNTIL ok% OR f$=""
5610 PROCfullwindow
5620 ENDPROC
5630 :
5640 DEF PROCecho
5650 LOCAL ERROR
5660 PROCsmallwindow
5670 X%=0
5680 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
5690 ok%=FALSE
5700 REPEAT
5710 INPUT "Enter filename: "f$
5720 IF f$<>" THEN
5730 X%=OPENOUTF$
5740 IF X%=0 THEN
5750 PRINT"Unable to open file"
5760 ELSE
5770 PROCrecalc
5780 BPUT #X%,samplerate%
5790 SYS "OS_GBPB",2,X%,buffer%,length%
*256
5800 CLOSE#X%X%=0
5810 SYS "OS_File",18,f$,d3C
5820 ok%=TRUE
5830 ENDIF
5840 UNTIL ok% OR f$=""
5850 PROCfullwindow
5860 ENDPROC
5870 :
5880 DEF PROCecho
5890 LOCAL ERROR
5900 PROCsmallwindow
5910 X%=0
5920 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
5930 ok%=FALSE
5940 REPEAT
5950 INPUT "Enter filename: "f$
5960 IF f$<>" THEN
5970 X%=OPENOUTF$
5980 IF X%=0 THEN
5990 PRINT"Unable to open file"
6000 ELSE
6010 PROCrecalc
6020 BPUT #X%,samplerate%
6030 SYS "OS_GBPB",2,X%,buffer%,length%
*256
6040 CLOSE#X%X%=0
6050 SYS "OS_File",18,f$,d3C
6060 ok%=TRUE
6070 ENDIF
6080 UNTIL ok% OR f$=""
6090 PROCfullwindow
6100 ENDPROC
6110 :
6120 DEF PROCecho
6130 LOCAL ERROR
6140 PROCsmallwindow
6150 X%=0
6160 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
6170 ok%=FALSE
6180 REPEAT
6190 INPUT "Enter filename: "f$
6200 IF f$<>" THEN
6210 X%=OPENOUTF$
6220 IF X%=0 THEN
6230 PRINT"Unable to open file"
6240 ELSE
6250 PROCrecalc
6260 BPUT #X%,samplerate%
6270 SYS "OS_GBPB",2,X%,buffer%,length%
*256
6280 CLOSE#X%X%=0
6290 SYS "OS_File",18,f$,d3C
6300 ok%=TRUE
6310 ENDIF
6320 UNTIL ok% OR f$=""
6330 PROCfullwindow
6340 ENDPROC
6350 :
6360 DEF PROCecho
6370 LOCAL ERROR
6380 PROCsmallwindow
6390 X%=0
6400 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
6410 ok%=FALSE
6420 REPEAT
6430 INPUT "Enter filename: "f$
6440 IF f$<>" THEN
6450 X%=OPENOUTF$
6460 IF X%=0 THEN
6470 PRINT"Unable to open file"
6480 ELSE
6490 PROCrecalc
6500 BPUT #X%,samplerate%
6510 SYS "OS_GBPB",2,X%,buffer%,length%
*256
6520 CLOSE#X%X%=0
6530 SYS "OS_File",18,f$,d3C
6540 ok%=TRUE
6550 ENDIF
6560 UNTIL ok% OR f$=""
6570 PROCfullwindow
6580 ENDPROC
6590 :
6600 DEF PROCecho
6610 LOCAL ERROR
6620 PROCsmallwindow
6630 X%=0
6640 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
6650 ok%=FALSE
6660 REPEAT
6670 INPUT "Enter filename: "f$
6680 IF f$<>" THEN
6690 X%=OPENOUTF$
6700 IF X%=0 THEN
6710 PRINT"Unable to open file"
6720 ELSE
6730 PROCrecalc
6740 BPUT #X%,samplerate%
6750 SYS "OS_GBPB",2,X%,buffer%,length%
*256
6760 CLOSE#X%X%=0
6770 SYS "OS_File",18,f$,d3C
6780 ok%=TRUE
6790 ENDIF
6800 UNTIL ok% OR f$=""
6810 PROCfullwindow
6820 ENDPROC
6830 :
6840 DEF PROCecho
6850 LOCAL ERROR
6860 PROCsmallwindow
6870 X%=0
6880 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
6890 ok%=FALSE
6900 REPEAT
6910 INPUT "Enter filename: "f$
6920 IF f$<>" THEN
6930 X%=OPENOUTF$
6940 IF X%=0 THEN
6950 PRINT"Unable to open file"
6960 ELSE
6970 PROCrecalc
6980 BPUT #X%,samplerate%
6990 SYS "OS_GBPB",2,X%,buffer%,length%
*256
7000 CLOSE#X%X%=0
7010 SYS "OS_File",18,f$,d3C
7020 ok%=TRUE
7030 ENDIF
7040 UNTIL ok% OR f$=""
7050 PROCfullwindow
7060 ENDPROC
7070 :
7080 DEF PROCecho
7090 LOCAL ERROR
7100 PROCsmallwindow
7110 X%=0
7120 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
7130 ok%=FALSE
7140 REPEAT
7150 INPUT "Enter filename: "f$
7160 IF f$<>" THEN
7170 X%=OPENOUTF$
7180 IF X%=0 THEN
7190 PRINT"Unable to open file"
7200 ELSE
7210 PROCrecalc
7220 BPUT #X%,samplerate%
7230 SYS "OS_GBPB",2,X%,buffer%,length%
*256
7240 CLOSE#X%X%=0
7250 SYS "OS_File",18,f$,d3C
7260 ok%=TRUE
7270 ENDIF
7280 UNTIL ok% OR f$=""
7290 PROCfullwindow
7300 ENDPROC
7310 :
7320 DEF PROCecho
7330 LOCAL ERROR
7340 PROCsmallwindow
7350 X%=0
7360 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
7370 ok%=FALSE
7380 REPEAT
7390 INPUT "Enter filename: "f$
7400 IF f$<>" THEN
7410 X%=OPENOUTF$
7420 IF X%=0 THEN
7430 PRINT"Unable to open file"
7440 ELSE
7450 PROCrecalc
7460 BPUT #X%,samplerate%
7470 SYS "OS_GBPB",2,X%,buffer%,length%
*256
7480 CLOSE#X%X%=0
7490 SYS "OS_File",18,f$,d3C
7500 ok%=TRUE
7510 ENDIF
7520 UNTIL ok% OR f$=""
7530 PROCfullwindow
7540 ENDPROC
7550 :
7560 DEF PROCecho
7570 LOCAL ERROR
7580 PROCsmallwindow
7590 X%=0
7600 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
7610 ok%=FALSE
7620 REPEAT
7630 INPUT "Enter filename: "f$
7640 IF f$<>" THEN
7650 X%=OPENOUTF$
7660 IF X%=0 THEN
7670 PRINT"Unable to open file"
7680 ELSE
7690 PROCrecalc
7700 BPUT #X%,samplerate%
7710 SYS "OS_GBPB",2,X%,buffer%,length%
*256
7720 CLOSE#X%X%=0
7730 SYS "OS_File",18,f$,d3C
7740 ok%=TRUE
7750 ENDIF
7760 UNTIL ok% OR f$=""
7770 PROCfullwindow
7780 ENDPROC
7790 :
7800 DEF PROCecho
7810 LOCAL ERROR
7820 PROCsmallwindow
7830 X%=0
7840 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
7850 ok%=FALSE
7860 REPEAT
7870 INPUT "Enter filename: "f$
7880 IF f$<>" THEN
7890 X%=OPENOUTF$
7900 IF X%=0 THEN
7910 PRINT"Unable to open file"
7920 ELSE
7930 PROCrecalc
7940 BPUT #X%,samplerate%
7950 SYS "OS_GBPB",2,X%,buffer%,length%
*256
7960 CLOSE#X%X%=0
7970 SYS "OS_File",18,f$,d3C
7980 ok%=TRUE
7990 ENDIF
8000 UNTIL ok% OR f$=""
8010 PROCfullwindow
8020 ENDPROC
8030 :
8040 DEF PROCecho
8050 LOCAL ERROR
8060 PROCsmallwindow
8070 X%=0
8080 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
8090 ok%=FALSE
8100 REPEAT
8110 INPUT "Enter filename: "f$
8120 IF f$<>" THEN
8130 X%=OPENOUTF$
8140 IF X%=0 THEN
8150 PRINT"Unable to open file"
8160 ELSE
8170 PROCrecalc
8180 BPUT #X%,samplerate%
8190 SYS "OS_GBPB",2,X%,buffer%,length%
*256
8200 CLOSE#X%X%=0
8210 SYS "OS_File",18,f$,d3C
8220 ok%=TRUE
8230 ENDIF
8240 UNTIL ok% OR f$=""
8250 PROCfullwindow
8260 ENDPROC
8270 :
8280 DEF PROCecho
8290 LOCAL ERROR
8300 PROCsmallwindow
8310 X%=0
8320 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
8330 ok%=FALSE
8340 REPEAT
8350 INPUT "Enter filename: "f$
8360 IF f$<>" THEN
8370 X%=OPENOUTF$
8380 IF X%=0 THEN
8390 PRINT"Unable to open file"
8400 ELSE
8410 PROCrecalc
8420 BPUT #X%,samplerate%
8430 SYS "OS_GBPB",2,X%,buffer%,length%
*256
8440 CLOSE#X%X%=0
8450 SYS "OS_File",18,f$,d3C
8460 ok%=TRUE
8470 ENDIF
8480 UNTIL ok% OR f$=""
8490 PROCfullwindow
8500 ENDPROC
8510 :
8520 DEF PROCecho
8530 LOCAL ERROR
8540 PROCsmallwindow
8550 X%=0
8560 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
8570 ok%=FALSE
8580 REPEAT
8590 INPUT "Enter filename: "f$
8600 IF f$<>" THEN
8610 X%=OPENOUTF$
8620 IF X%=0 THEN
8630 PRINT"Unable to open file"
8640 ELSE
8650 PROCrecalc
8660 BPUT #X%,samplerate%
8670 SYS "OS_GBPB",2,X%,buffer%,length%
*256
8680 CLOSE#X%X%=0
8690 SYS "OS_File",18,f$,d3C
8700 ok%=TRUE
8710 ENDIF
8720 UNTIL ok% OR f$=""
8730 PROCfullwindow
8740 ENDPROC
8750 :
8760 DEF PROCecho
8770 LOCAL ERROR
8780 PROCsmallwindow
8790 X%=0
8800 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
8810 ok%=FALSE
8820 REPEAT
8830 INPUT "Enter filename: "f$
8840 IF f$<>" THEN
8850 X%=OPENOUTF$
8860 IF X%=0 THEN
8870 PRINT"Unable to open file"
8880 ELSE
8890 PROCrecalc
8900 BPUT #X%,samplerate%
8910 SYS "OS_GBPB",2,X%,buffer%,length%
*256
8920 CLOSE#X%X%=0
8930 SYS "OS_File",18,f$,d3C
8940 ok%=TRUE
8950 ENDIF
8960 UNTIL ok% OR f$=""
8970 PROCfullwindow
8980 ENDPROC
8990 :
9000 DEF PROCecho
9010 LOCAL ERROR
9020 PROCsmallwindow
9030 X%=0
9040 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
9050 ok%=FALSE
9060 REPEAT
9070 INPUT "Enter filename: "f$
9080 IF f$<>" THEN
9090 X%=OPENOUTF$
9100 IF X%=0 THEN
9110 PRINT"Unable to open file"
9120 ELSE
9130 PROCrecalc
9140 BPUT #X%,samplerate%
9150 SYS "OS_GBPB",2,X%,buffer%,length%
*256
9160 CLOSE#X%X%=0
9170 SYS "OS_File",18,f$,d3C
9180 ok%=TRUE
9190 ENDIF
9200 UNTIL ok% OR f$=""
9210 PROCfullwindow
9220 ENDPROC
9230 :
9240 DEF PROCecho
9250 LOCAL ERROR
9260 PROCsmallwindow
9270 X%=0
9280 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
9290 ok%=FALSE
9300 REPEAT
9310 INPUT "Enter filename: "f$
9320 IF f$<>" THEN
9330 X%=OPENOUTF$
9340 IF X%=0 THEN
9350 PRINT"Unable to open file"
9360 ELSE
9370 PROCrecalc
9380 BPUT #X%,samplerate%
9390 SYS "OS_GBPB",2,X%,buffer%,length%
*256
9400 CLOSE#X%X%=0
9410 SYS "OS_File",18,f$,d3C
9420 ok%=TRUE
9430 ENDIF
9440 UNTIL ok% OR f$=""
9450 PROCfullwindow
9460 ENDPROC
9470 :
9480 DEF PROCecho
9490 LOCAL ERROR
9500 PROCsmallwindow
9510 X%=0
9520 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
9530 ok%=FALSE
9540 REPEAT
9550 INPUT "Enter filename: "f$
9560 IF f$<>" THEN
9570 X%=OPENOUTF$
9580 IF X%=0 THEN
9590 PRINT"Unable to open file"
9600 ELSE
9610 PROCrecalc
9620 BPUT #X%,samplerate%
9630 SYS "OS_GBPB",2,X%,buffer%,length%
*256
9640 CLOSE#X%X%=0
9650 SYS "OS_File",18,f$,d3C
9660 ok%=TRUE
9670 ENDIF
9680 UNTIL ok% OR f$=""
9690 PROCfullwindow
9700 ENDPROC
9710 :
9720 DEF PROCecho
9730 LOCAL ERROR
9740 PROCsmallwindow
9750 X%=0
9760 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
9770 ok%=FALSE
9780 REPEAT
9790 INPUT "Enter filename: "f$
9800 IF f$<>" THEN
9810 X%=OPENOUTF$
9820 IF X%=0 THEN
9830 PRINT"Unable to open file"
9840 ELSE
9850 PROCrecalc
9860 BPUT #X%,samplerate%
9870 SYS "OS_GBPB",2,X%,buffer%,length%
*256
9880 CLOSE#X%X%=0
9890 SYS "OS_File",18,f$,d3C
9900 ok%=TRUE
9910 ENDIF
9920 UNTIL ok% OR f$=""
9930 PROCfullwindow
9940 ENDPROC
9950 :
9960 DEF PROCecho
9970 LOCAL ERROR
9980 PROCsmallwindow
9990 X%=0
10000 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
10010 ok%=FALSE
10020 REPEAT
10030 INPUT "Enter filename: "f$
10040 IF f$<>" THEN
10050 X%=OPENOUTF$
10060 IF X%=0 THEN
10070 PRINT"Unable to open file"
10080 ELSE
10090 PROCrecalc
10100 BPUT #X%,samplerate%
10110 SYS "OS_GBPB",2,X%,buffer%,length%
*256
10120 CLOSE#X%X%=0
10130 SYS "OS_File",18,f$,d3C
10140 ok%=TRUE
10150 ENDIF
10160 UNTIL ok% OR f$=""
10170 PROCfullwindow
10180 ENDPROC
10190 :
10200 DEF PROCecho
10210 LOCAL ERROR
10220 PROCsmallwindow
10230 X%=0
10240 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
10250 ok%=FALSE
10260 REPEAT
10270 INPUT "Enter filename: "f$
10280 IF f$<>" THEN
10290 X%=OPENOUTF$
10300 IF X%=0 THEN
10310 PRINT"Unable to open file"
10320 ELSE
10330 PROCrecalc
10340 BPUT #X%,samplerate%
10350 SYS "OS_GBPB",2,X%,buffer%,length%
*256
10360 CLOSE#X%X%=0
10370 SYS "OS_File",18,f$,d3C
10380 ok%=TRUE
10390 ENDIF
10400 UNTIL ok% OR f$=""
10410 PROCfullwindow
10420 ENDPROC
10430 :
10440 DEF PROCecho
10450 LOCAL ERROR
10460 PROCsmallwindow
10470 X%=0
10480 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
10490 ok%=FALSE
10500 REPEAT
10510 INPUT "Enter filename: "f$
10520 IF f$<>" THEN
10530 X%=OPENOUTF$
10540 IF X%=0 THEN
10550 PRINT"Unable to open file"
10560 ELSE
10570 PROCrecalc
10580 BPUT #X%,samplerate%
10590 SYS "OS_GBPB",2,X%,buffer%,length%
*256
10600 CLOSE#X%X%=0
10610 SYS "OS_File",18,f$,d3C
10620 ok%=TRUE
10630 ENDIF
10640 UNTIL ok% OR f$=""
10650 PROCfullwindow
10660 ENDPROC
10670 :
10680 DEF PROCecho
10690 LOCAL ERROR
10700 PROCsmallwindow
10710 X%=0
10720 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
10730 ok%=FALSE
10740 REPEAT
10750 INPUT "Enter filename: "f$
10760 IF f$<>" THEN
10770 X%=OPENOUTF$
10780 IF X%=0 THEN
10790 PRINT"Unable to open file"
10800 ELSE
10810 PROCrecalc
10820 BPUT #X%,samplerate%
10830 SYS "OS_GBPB",2,X%,buffer%,length%
*256
10840 CLOSE#X%X%=0
10850 SYS "OS_File",18,f$,d3C
10860 ok%=TRUE
10870 ENDIF
10880 UNTIL ok% OR f$=""
10890 PROCfullwindow
10900 ENDPROC
10910 :
10920 DEF PROCecho
10930 LOCAL ERROR
10940 PROCsmallwindow
10950 X%=0
10960 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
10970 ok%=FALSE
10980 REPEAT
10990 INPUT "Enter filename: "f$
11000 IF f$<>" THEN
11010 X%=OPENOUTF$
11020 IF X%=0 THEN
11030 PRINT"Unable to open file"
11040 ELSE
11050 PROCrecalc
11060 BPUT #X%,samplerate%
11070 SYS "OS_GBPB",2,X%,buffer%,length%
*256
11080 CLOSE#X%X%=0
11090 SYS "OS_File",18,f$,d3C
11100 ok%=TRUE
11110 ENDIF
11120 UNTIL ok% OR f$=""
11130 PROCfullwindow
11140 ENDPROC
11150 :
11160 DEF PROCecho
11170 LOCAL ERROR
11180 PROCsmallwindow
11190 X%=0
11200 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
11210 ok%=FALSE
11220 REPEAT
11230 INPUT "Enter filename: "f$
11240 IF f$<>" THEN
11250 X%=OPENOUTF$
11260 IF X%=0 THEN
11270 PRINT"Unable to open file"
11280 ELSE
11290 PROCrecalc
11300 BPUT #X%,samplerate%
11310 SYS "OS_GBPB",2,X%,buffer%,length%
*256
11320 CLOSE#X%X%=0
11330 SYS "OS_File",18,f$,d3C
11340 ok%=TRUE
11350 ENDIF
11360 UNTIL ok% OR f$=""
11370 PROCfullwindow
11380 ENDPROC
11390 :
11400 DEF PROCecho
11410 LOCAL ERROR
11420 PROCsmallwindow
11430 X%=0
11440 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
11450 ok%=FALSE
11460 REPEAT
11470 INPUT "Enter filename: "f$
11480 IF f$<>" THEN
11490 X%=OPENOUTF$
11500 IF X%=0 THEN
11510 PRINT"Unable to open file"
11520 ELSE
11530 PROCrecalc
11540 BPUT #X%,samplerate%
11550 SYS "OS_GBPB",2,X%,buffer%,length%
*256
11560 CLOSE#X%X%=0
11570 SYS "OS_File",18,f$,d3C
11580 ok%=TRUE
11590 ENDIF
11600 UNTIL ok% OR f$=""
11610 PROCfullwindow
11620 ENDPROC
11630 :
11640 DEF PROCecho
11650 LOCAL ERROR
11660 PROCsmallwindow
11670 X%=0
11680 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
11690 ok%=FALSE
11700 REPEAT
11710 INPUT "Enter filename: "f$
11720 IF f$<>" THEN
11730 X%=OPENOUTF$
11740 IF X%=0 THEN
11750 PRINT"Unable to open file"
11760 ELSE
11770 PROCrecalc
11780 BPUT #X%,samplerate%
11790 SYS "OS_GBPB",2,X%,buffer%,length%
*256
11800 CLOSE#X%X%=0
11810 SYS "OS_File",18,f$,d3C
11820 ok%=TRUE
11830 ENDIF
11840 UNTIL ok% OR f$=""
11850 PROCfullwindow
11860 ENDPROC
11870 :
11880 DEF PROCecho
11890 LOCAL ERROR
11900 PROCsmallwindow
11910 X%=0
11920 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
11930 ok%=FALSE
11940 REPEAT
11950 INPUT "Enter filename: "f$
11960 IF f$<>" THEN
11970 X%=OPENOUTF$
11980 IF X%=0 THEN
11990 PRINT"Unable to open file"
12000 ELSE
12010 PROCrecalc
12020 BPUT #X%,samplerate%
12030 SYS "OS_GBPB",2,X%,buffer%,length%
*256
12040 CLOSE#X%X%=0
12050 SYS "OS_File",18,f$,d3C
12060 ok%=TRUE
12070 ENDIF
12080 UNTIL ok% OR f$=""
12090 PROCfullwindow
12100 ENDPROC
12110 :
12120 DEF PROCecho
12130 LOCAL ERROR
12140 PROCsmallwindow
12150 X%=0
12160 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
12170 ok%=FALSE
12180 REPEAT
12190 INPUT "Enter filename: "f$
12200 IF f$<>" THEN
12210 X%=OPENOUTF$
12220 IF X%=0 THEN
12230 PRINT"Unable to open file"
12240 ELSE
12250 PROCrecalc
12260 BPUT #X%,samplerate%
12270 SYS "OS_GBPB",2,X%,buffer%,length%
*256
12280 CLOSE#X%X%=0
12290 SYS "OS_File",18,f$,d3C
12300 ok%=TRUE
12310 ENDIF
12320 UNTIL ok% OR f$=""
12330 PROCfullwindow
12340 ENDPROC
12350 :
12360 DEF PROCecho
12370 LOCAL ERROR
12380 PROCsmallwindow
12390 X%=0
12400 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
12410 ok%=FALSE
12420 REPEAT
12430 INPUT "Enter filename: "f$
12440 IF f$<>" THEN
12450 X%=OPENOUTF$
12460 IF X%=0 THEN
12470 PRINT"Unable to open file"
12480 ELSE
12490 PROCrecalc
12500 BPUT #X%,samplerate%
12510 SYS "OS_GBPB",2,X%,buffer%,length%
*256
12520 CLOSE#X%X%=0
12530 SYS "OS_File",18,f$,d3C
12540 ok%=TRUE
12550 ENDIF
12560 UNTIL ok% OR f$=""
12570 PROCfullwindow
12580 ENDPROC
12590 :
12600 DEF PROCecho
12610 LOCAL ERROR
12620 PROCsmallwindow
12630 X%=0
12640 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
12650 ok%=FALSE
12660 REPEAT
12670 INPUT "Enter filename: "f$
12680 IF f$<>" THEN
12690 X%=OPENOUTF$
12700 IF X%=0 THEN
12710 PRINT"Unable to open file"
12720 ELSE
12730 PROCrecalc
12740 BPUT #X%,samplerate%
12750 SYS "OS_GBPB",2,X%,buffer%,length%
*256
12760 CLOSE#X%X%=0
12770 SYS "OS_File",18,f$,d3C
12780 ok%=TRUE
12790 ENDIF
12800 UNTIL ok% OR f$=""
12810 PROCfullwindow
12820 ENDPROC
12830 :
12840 DEF PROCecho
12850 LOCAL ERROR
12860 PROCsmallwindow
12870 X%=0
12880 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
12890 ok%=FALSE
12900 REPEAT
12910 INPUT "Enter filename: "f$
12920 IF f$<>" THEN
12930 X%=OPENOUTF$
12940 IF X%=0 THEN
12950 PRINT"Unable to open file"
12960 ELSE
12970 PROCrecalc
12980 BPUT #X%,samplerate%
12990 SYS "OS_GBPB",2,X%,buffer%,length%
*256
13000 CLOSE#X%X%=0
13010 SYS "OS_File",18,f$,d3C
13020 ok%=TRUE
13030 ENDIF
13040 UNTIL ok% OR f$=""
13050 PROCfullwindow
13060 ENDPROC
13070 :
13080 DEF PROCecho
13090 LOCAL ERROR
13100 PROCsmallwindow
13110 X%=0
13120 ON ERROR LOCAL PRINT'REPORT$;" (Er
ror &"/"ERR;")":IF X%<0 THEN CLOSE#X:X
%0
13130 ok%=FALSE
13140 REPEAT
13150 INPUT "Enter filename: "f$
13160 IF f$<>" THEN
13170 X%=OPENOUTF$
13180 IF X%=0 THEN
13190 PRINT"Unable to open file"
13200 ELSE
13210 PROCrecalc
13220 BPUT #X%,samplerate%
13230 SYS "OS_GBPB",2,X%,buffer%,length%
*256
13240 CLOSE#X%X%=0
13250 SYS "OS_File",18,f$,d3C
13260 ok%=TRUE
13270 ENDIF
13280 UNTIL ok% OR f$=""
13290 PROCfullwindow
1
```



```

        bbc_move(x,y);
        bbc_draw(s[p][1],s[p][2]);
    }
    wait();
    os_sw12(OS_Byte,112,t);
    os_sw12(OS_Byte,113,u);
    swap(&t,&u);
}

```




```

1030 DEFPROCDOsave(D%)
1040 IF D% gn$=FWGetStr(bw*44) ELSE gn$
=FWGetStr(fn%)
1050 IF INSTR(gn$,"")=0 Z%FWImpErr("
To save, drag the file icon to a directo
ry viewer") :ENDPROC
1060 LOCALORROR:ONERRORLOCAL:Z%=FWImpE
rr(REPORT%) :ENDPROC
1070 gn$=gn$:sf$fn$=gn$:df$=OPENOUT(gn$)
:RESTOREERROR
1080 PROCHourOn
1090 BPUT#df$, "Draw" : PROCWout(201) :
CWOout(0) : BPUT#df$, "Graph
" :
1100 PROCWout(0) : PROCWout(0) : PROCWout(p
x*di%) : PROCWout(py*d%)
1110 Z%=PTR#df$:PROCWout(0) : PROCWout(0)
: BPUT#df$, 1 : BPUT#df$, $fonta(axisfont) : B
PUT#df$, 0 : font$(1,3)=1
1120 IF titlefont=axisfont font$(2,3)=1
ELSE BPUT#df$, 2 : BPUT#df$, $fonta(titlefo
nt) : BPUT#df$, 0 : font$(2,3)=2
1130 IF scalefont=axisfont font$(3,3)=1
ELSE IF scalefont=tilefont font$(3,3)=
2 ELSE BPUT#df$, 3 : BPUT#df$, $fonta(scale
font) : BPUT#df$, 0 : font$(3,3)=2 : font$(3,3)
=3
1140 PROCpad:X%=PTR#df$:PTR#df$=Z%+4:PR
OCWout(X%-Z%) : PTR#df$=X%
1150 PROCdtext(2,adX+vx/2*d%, (py-0.15
)*d%, title$,1)
1160 IF LEN(xaxis$)>0 PROCdtext(1,adX+
vx/2*d%, 0.15*d%, xaxis$,1)
1170 La=LEN(yaxis$):IF La=0 Y%=ady%+(vy
/2+1/6)*d%+di%:FOR I%=1 TO La:PROCdtext(1
,0.1*d%, Y%-Y%+di%/8,MIDS(Yaxis$,I%,1),1)
: NEXT I%
1180 PROCStartg
1190 FOR gr=1 TO ng%
1200 FOR P%=1 TO nxy%(gr%)
1210 xd=X(d%)-xlo:yd=Y(d%)-ylo:d%=
1
1220 IF bar% THEN PROCbar ELSE PRO
Cgraph
1230 first%=FALSE
1240 NEXT
1250 IF bar% THEN PROCbar2 ELSE IF 1
n%(gr%)>0 PROCWout(0)
1260 first%=TRUE
1270 NEXT
1280 IF NOT bar% PROCdsymbol
1290 PROCphdr(3,adX,ady,d%,px,di%*py
,-1,0,256,0) : PROCcpthm(adX,ady,di%) : PROCcph
t(adX,ady) : PROCcpthd(axm%,ady%) : PROCWou
t(0) : REM AXIS
1300 IF xtext%ANDbar% o%bw/2*d% ELSE
o%=0
1310 PROCphdr(xg%*2*(xtext%+1)+yg%*2+nx
g%*2+nyg%*2,adX,ady,di%*px,di%*py,-1,0
,64,0)
1320 X=xx/xg%*di%:Y=yy/yg%*di%:X%=0.04*
di%:Y%=0.04*di%:REM Minor grid
1330 IF NOT(xtext%) FOR I%=1 TO xg%:PRO
Cpthm(adX+X%*I%,ady%) : PROCcpthd(adX+X%*I%
,ady%,I%) : NEXT
1340 FOR I%=1 TO yg%:PROCcpthm(adX,ady%
+Y%*I%) : PROCcpthd(adX-X%,ady%+Y%*I%) : NEXT
1350 X=xx/xxg%*di%:Y=yy/nyg%*di%:X%=0.0
7*d%:Y%=0.07*d%:REM Major grid
1360 FOR I%=1 TO nxg%:PROCcpthm(adX+X%*
I%-xtext%*bar%) o%,adY%) : PROCcpthd(adX+X%
*I%-xtext%*bar%) o%,adY%-I%) : NEXT
1370 FOR I%=1 TO nyg%:PROCcpthm(adX,ady%
+Y%*I%) : PROCcpthd(adX-X%,ady%+Y%*I%) : NEXT
1380 PROCWout(0)
1390 FOR I%=0 TO nxg%:PROCdtext(3,adX+
X%*I%,o%,ady%,0.2*d%,x$(I%),1) : NEXT
1400 Y=yr/nyg%:FOR I%=0 TO nyg%:PROCdte
xt(3,adX+0.1*d%,ady%-1800+Y%*I%,STR$(yl
o+I%*y),2) : NEXT
1410 CLOSE#df$:OSCLI("SETTYPE "+gn$+" A
FF")
1420 IF D% PROCWimpackSave
1430 IF butVAND44 PROCWimpCLM
1440 PROCWimpNewtile(Graph%) : PROCHour$
ma$
1450 ENDPROC
1460 :
1470 DEFPROCProcgraph:LOCAL x,y
1480 x=adX+xd*xsd:y=ady+ydy
1490 CASE ln%(gr%) OF
1500 WHEN 0:REM no line
1510 WHEN 1:IF first% THEN PROCcpthd(n
xy%(gr%),adX,ady,axm%,aym%,-1,0,64,0) :
PROCcpthm(x,y):ELSE PROCcpthd(x,y):REM seg
mented line
1520 WHEN 2:XL(P%)=x:YL(P%)=y:IF P%<
nxy%(gr%) : PROCcfl(adX,ady,axm%,aym%):PR
OCphdr(2,adX,ady,axm%,aym%,-1,0,64,0) :
PROCcpthm(xstart,ystart) : PROCcpthd(xend,y
end):REM least-squares fit
1530 ENDCASE
1540 ENDPROC
1550 :
1560 DEFPROCbar
1570 IF first% AND gr%>1 PROCbar2
1580 IF xd>xinc*(I%-1) THEN
1590 IF c%>0 d(i%)=di%/(c%*c%>0
1600 I%>xd/xinc
1610 ENDP
1620 c%>1:d(i%)+yd
1630 ENDPROC
1640 DEFPROCbar2:IF c%>0 d(i%)+d(i%)/c
%
1650 IF bar3% THEN
1660 bw3d=bw/4*d%
1670 FOR I%=0 TO i%
1680 X=adX+bw*I%*di%:bw3d:y%>ady%+d
(I%)*yd
1690
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790
1800
1810
1820
1830
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2110
2120
2130
2140
2150
2160
2170
2180
2190
2200
2210
2220
2230
2240
2250
2260
2270
2280
2290
2300
2310
2320
2330
2340
2350
2360
2370
2380
2390
2400
2410
2420
2430
2440
2450
2460
2470
2480
2490
2500
2510
2520
2530
2540
2550
2560
2570
2580
2590
2600
2610
2620
2630
2640
2650
2660
2670
2680
2690
2700
2710
2720
2730
2740
2750
2760
2770
2780
2790
2800
2810
2820
2830
2840
2850
2860
2870
2880
2890
2900
2910
2920
2930
2940
2950
2960
2970
2980
2990
3000
3010
3020
3030
3040
3050
3060
3070
3080
3090
3100
3110
3120
3130
3140
3150
3160
3170
3180
3190
3200
3210
3220
3230
3240
3250
3260
3270
3280
3290
3300
3310
3320
3330
3340
3350
3360
3370
3380
3390
3400
3410
3420
3430
3440
3450
3460
3470
3480
3490
3500
3510
3520
3530
3540
3550
3560
3570
3580
3590
3600
3610
3620
3630
3640
3650
3660
3670
3680
3690
3700
3710
3720
3730
3740
3750
3760
3770
3780
3790
3800
3810
3820
3830
3840
3850
3860
3870
3880
3890
3900
3910
3920
3930
3940
3950
3960
3970
3980
3990
4000
4010
4020
4030
4040
4050
4060
4070
4080
4090
4100
4110
4120
4130
4140
4150
4160
4170
4180
4190
4200
4210
4220
4230
4240
4250
4260
4270
4280
4290
4300
4310
4320
4330
4340
4350
4360
4370
4380
4390
4400
4410
4420
4430
4440
4450
4460
4470
4480
4490
4500
4510
4520
4530
4540
4550
4560
4570
4580
4590
4600
4610
4620
4630
4640
4650
4660
4670
4680
4690
4700
4710
4720
4730
4740
4750
4760
4770
4780
4790
4800
4810
4820
4830
4840
4850
4860
4870
4880
4890
4900
4910
4920
4930
4940
4950
4960
4970
4980
4990
5000
5010
5020
5030
5040
5050
5060
5070
5080
5090
5100
5110
5120
5130
5140
5150
5160
5170
5180
5190
5200
5210
5220
5230
5240
5250
5260
5270
5280
5290
5300
5310
5320
5330
5340
5350
5360
5370
5380
5390
5400
5410
5420
5430
5440
5450
5460
5470
5480
5490
5500
5510
5520
5530
5540
5550
5560
5570
5580
5590
5600
5610
5620
5630
5640
5650
5660
5670
5680
5690
5700
5710
5720
5730
5740
5750
5760
5770
5780
5790
5800
5810
5820
5830
5840
5850
5860
5870
5880
5890
5900
5910
5920
5930
5940
5950
5960
5970
5980
5990
6000
6010
6020
6030
6040
6050
6
```



```

4070 DATA 16,8,4,2,1,1,1,1
4080 DATA 18,9,3,1,1,1,1,1
4090 ENDPROC
4100 DEFPROCvar1
4110 IF TS% ox=1280/sw:oy=1024/sh ELSE
ox=180:oy=180:REM OS Units Per inch
4120 di% =180*256:REM Draw units per inc
h
4130 mpdi=di%/72000:REM Conversion for
millipoints to draw units
4140 ocmp=72000/ox:REM Conversion for O
S units to millipoints
4150 vx=px-1:vy=py-1:REM Visible plotte
d graph size (inches)
4160 lx=ox*px:ly=oy*py:REM Total Grap
h size in OS Units
4170 gx=ox*vx:gy=oy*vy:REM Actual gra
ph size (OS units)
4180 ax=ox*.75:ay=-.65:oy:REM Ax
is Coordinates Relative to work origin
4190 adx=di*.75:ady=di*.65:axm=adx
%vx:di%aym=ady%vy:di%REM Axis Coord
inates - Draw units
4200 ENDPROC
4210 DEFPROCvar2:ngx% =0:xy% =0:ny% =0:yg
% =0:xlo=0:xhi=0:ylo=0:yhi=0:yr=0:yr=0
4220 PROCGrid(minx,maxx,xmin,xmax,xlo,x
hi,xr,vx,xg,xg,xdi%
4230 IF NOT xtext% xxr/ngx%:FOR I% =0 T
O ngx%:x$(I%)=STR$(xlo+I%*T%):NEXT
I%
4240 IF ngx%>nval% AND NOT xtext% nval%
=ngx%
4250 xinc=xxr/nval%:bw=xxr/(nval%-xtext%)
4260 PROCGrid(minx,maxx,ymin,ymax,ylo,y
hi,yr,vy,yg,yg,ydi%)
4270 xs=gx/xr:ys=gy/yr:REM Scale unit
s
4280 xsd=xs*di%/xr:ysd=ys*di%/yr:REM Sc
ale units Drawfile
4290 sw=lx:sh=ly:REM Window size
4300 ENDPROC
4310 DEFPROCgrid(m,n,u,v,RETURN a,RETURN
N b,RETURN r,s,RETURN X%,RETURN Y%,W%):L
OCAL f,i
4320 f=(v-u)/(n-m)
4330 IF W%>0 THEN
4340 nval%=Pint(v-u):X%=nval%
4350 I%=0:WHILE g%(X%,I%)>2.5*f:I%+
=1:ENDWHILE:X%=g%(X%,I%)
4360 i=(v-u)/X%:I%=0:WHILE u+I%+1<=
m:I%+1:ENDWHILE:a=u+I%+1
4370 I%=1:WHILE v-I%-1<=n:I%+1:END
WHILE:b=v-I%-1
4380 r=b-a:xxr=r/i
4390 ELSE a=r:xxr=r/i
4400 ENDIF
4410 Y%=Pint(r)*10/X%:IF Y%>9 Y%=Y%/10
4420 i=0:WHILE I%<10:IF I%<1 Y%=Y%+10
ELSE Y%=Y%-10
4430 ENDWHILE:Y%=Y%+10
4440 ENDPROC
4450 DEFPINT(n):LOCAL i
4460 DEFPINT(n):LOCAL i
4470 DEFPINT(n):LOCAL i
4480 DEFPINT(n):LOCAL i
4490 DEFPINT(n):LOCAL i
4500 DEFPINT(n):LOCAL i
4510 DEFPINT(n):LOCAL i
4520 DEFPINT(n):LOCAL i
4530 DEFPINT(n):LOCAL i
4540 DEFPINT(n):LOCAL i
4550 DEFPINT(n):LOCAL i
4560 DEFPINT(n):LOCAL i
4570 DEFPINT(n):LOCAL i
4580 DEFPINT(n):LOCAL i
4590 DEFPINT(n):LOCAL i
4600 DEFPINT(n):LOCAL i
4610 DEFPINT(n):LOCAL i
4620 DEFPINT(n):LOCAL i
4630 DEFPINT(n):LOCAL i
4640 DEFPINT(n):LOCAL i
4650 DEFPINT(n):LOCAL i
4660 DEFPINT(n):LOCAL i
4670 DEFPINT(n):LOCAL i
4680 DEFPINT(n):LOCAL i
4690 DEFPINT(n):LOCAL i
4700 DEFPINT(n):LOCAL i
4710 DEFPINT(n):LOCAL i
4720 DEFPINT(n):LOCAL i

```

```

4730 ENDPROC
4740 DEFPROCnewfont(mf,xf,nf)
4750 PROCWimpTick(mf,xf):PROCWimpTick(
mf,nf):PROC1f
4760 IF mf=axmf axisfont=nf ELSEIF mf=
scmf scalefont=nf ELSE titlefont=nf
4770 PROCgf:PROCforce
4780 ENDPROC
4790 :
4800 DEFPROCsymbol(n%,x,y):LOCAL s():DI
M s(3)
4810 s(1)=(gx%+gy%)/200:s(2)=(1)/1.4:s
(3)=(1)/1.2
4820 CASE n% OF
4830 WHEN 1:MOVE x-s(1),y-s(1)/SQR(3)
:DRAWBY s(1),s(1)*SQR(3):DRAWBY s(1),-s
(1)*SQR(3):DRAWBY -2*s(1),0:MOVEBY s(1),s
(1)/SQR(3)
4840 WHEN 2:RECTANGLE x-s(2),y-s(2),2
*s(2),2*s(2):MOVEBY s(2),s(2)
4850 WHEN 3:CIRCLE x,y,s(3):MOVEBY -s
(3),0
4860 WHEN 4:MOVE x-s(1),y-s(1)/SQR(3)
:DRAWBY s(1),s(1)*SQR(3):PLOT81,s(1),-s
(1)*SQR(3):MOVE x,y
4870 WHEN 5:RECTANGLE FILL x-s(2),y-s
(2),2*s(2),2*s(2):MOVE x,y
4880 WHEN 6:CIRCLE FILL x,y,s(3):MOVE
x,y
4890 ENDCASE
4900 ENDPROC
4910 :
4920 DEFPROCsymbol:LOCAL x,y,I%,s():DI
M s(3)
4930 d% =0:s(1)=(vx%+vy%)*180*256/200:s(2)
=s(1)/1.4:s(3)=s(1)/1.2
4940 FOR gr% =1 TO ng%
4950 FOR P% =1 TO nxy%(gr%)
4960 x=X(d%)-xlo:yd=Y(d%)-ylo:d%+=
1
4970 x=adx%+xd%:ysd=y%+yd%:ysd
4980 CASE sym%(gr%) OF
4990 WHEN 0:REM no symbols
5000 WHEN 1:PROCpchr(4,adx%,ady%,ax
m%,aym%,0,0,64,0):PROCpchr(x-s(1),y-s(1)
)/SQR(3):PROCpchr(x-s(2),y-s(2)):PROCp
chr(x-s(1),y-s(1)/SQR(3)):PROCpchr(x-s
(1),y-s(1)/SQR(3)):PROCpchr(0):REM open
triangles
5010 WHEN 2:PROCpchr(5,adx%,ady%,ax
m%,aym%,0,0,64,0):PROCpchr(x-s(2),y-s(2)
):PROCpchr(x-s(2),y-s(2)):PROCpchr(x-s(2),y-s(2)):PROCp
chr(x-s(2),y-s(2)):PROCpchr(0):REM open
squares
5020 WHEN 3:PROCpchr(17,adx%,ady%,a
xm%,aym%,0,0,64,0):PROCpchr(x-s(1),y-s(1)
)/SQR(3):PROCpchr(x-s(2),y-s(2)):PROCp
chr(x-s(1),y-s(1)/SQR(3)):PROCpchr(x-s
(1),y-s(1)/SQR(3)):PROCpchr(0):REM fille
d triangles
5030 WHEN 4:PROCpchr(4,adx%,ady%,ax
m%,aym%,0,0,64,0):PROCpchr(x-s(1),y-s(1)
)/SQR(3):PROCpchr(x-s(1),y-s(1)/SQR(3)):P
ROCpchr(x-s(1),y-s(1)/SQR(3)):PROCpchr(x-s
(1),y-s(1)/SQR(3)):PROCpchr(0):REM fille
d squares
5040 WHEN 5:PROCpchr(5,adx%,ady%,ax
m%,aym%,0,0,64,0):PROCpchr(x-s(2),y-s(2)
):PROCpchr(x-s(2),y-s(2)):PROCpchr(x-s(2),y-s(2)):PROCp
chr(x-s(2),y-s(2)):PROCpchr(0):REM fille
d squares
5050 WHEN 6:PROCpchr(17,adx%,ady%,a
xm%,aym%,0,0,64,0):PROCpchr(x-s(3),y-s(3)
)/SQR(3):PROCpchr(x-s(3),y-s(3)):PROCp
chr(x-s(3),y-s(3)):PROCpchr(0):REM fille
d circles
5060 ENDCASE
5070 NEXT
5080 NEXT
5090 ENDPROC
5100 :
5110 DEFPROCfit(x0,y0,x1,y1):LOCAL I%,x
m,y,num,denom,xi,yi,m:xm=0:ym=0
5120 FOR I% =1 TO nxy%(gr%):xm=xm+XL(I%)
:ym=ym+YL(I%):NEXT
5130 xm=xm/nxy%(gr%):ym=ym/nxy%(gr%)
5140 num=0:denom=0:FOR I% =1 TO nxy%(gr%)
:i=num+XL(I%)-xm*(YL(I%)-ym):denom=
denom+(XL(I%)-xm)*(YL(I%)-ym):NEXT
5150 num=num/denom
5160 REM Find intersections with bounda
ries (left, right, bottom, top)
5170 xstart=0:ystart=0:xend=0:yend=0
5180 yi=ym-m*(x0-xm):IF yi>y0 AND yi<
y1 THEN xstart=x0:ystart=yi
5190 yi=ym-m*(x1-xm)
5200 IF yi>y0 AND yi<y1 THEN
5210 IF xstart=0 AND ystart=0 THEN xs
tart=x1:ystart=yi ELSE xend=x1:yend=yi
5220 ENDIF
5230 xi=(y0-ym)/m+xm
5240 IF xi>x0 AND xi<x1 THEN
5250 IF xstart=0 AND ystart=0 THEN xs
tart=xi:ystart=y0 ELSE xend=xi:yend=y0
5260 ENDIF
5270 xi=(y1-ym)/m+xm
5280 IF xi>x0 AND xi<x1 THEN xend=xi:ye
nd=y1
5290 ENDPROC

```

Listing 3 - WimpLib

```

10 REM > WimpLib v1.10 : General Wimp
Procedures
20 REM © Mike Curnow May 1991
30 DEFPROCWimpInit(n$,s%)
40 SYS"Wimp_Initialise",200,64534154
,n$,CHR$0
50 DIM b% S%,mb% &400:menufree% =mb%:im
enuend% =mb%+&400:taskn% =n$
60 ENDPROC
70 :
80 DEFFNIconTask(n$):LOCAL S%,T%
90 S% =OPENIN("<ObeyDir>.!Sprites"):T%
=EXT%$%+16:CLOSE%$%:IF S%>0 =0
100 DIM S% T%:S% =T%:S% =16
110 SYS "OS_SpriteOp",&109,S%
120 SYS "OS_SpriteOp",&10A,S%,"<ObeyD
ir>.!Sprites"
130 I% =1:b% =0:b% =0:b% =12:S% =132*1
64:b% =16:S% =136*44:b% =120=&2102
140 DIM b%124 (LENn%+1):$(b%124) =n$:b%
128=S%
150 b%132=LENn%+1:SYS"Wimp_CreateIcon"
,,b% TO T%
160 T%
170 :
180 DEFPROCWimpCLM:SYS"Wimp_CreateMenu
",,TRUE:ENDPROC
190 :
200 DEFFNWimpMenu(handle%,menu$,menuti
tle%)
210 IF menufree%+28 > menuend% THEN ER
ROR "Menu area full"
220 LOCAL h%,i%,m%,w%,y%,item%:h% =4:me
nufr% =menufree%
230 $menuptr% =menutitle%
240 menuptr%12=7:menuptr%13=2:menup
tr%14=7:menuptr%15=10
250 menuptr%120=44:menuptr%124=0:menup
tr% =28:w% =LENmenutitle%-2
260 REPEAT item% =Fmpar("",""):PROCmnu
tem(item%):h% +=44:UNTIL item%=""
270 m% =menufree%:m% =16=(w%+8+6)*2:h% =
44
280 IF handle%>0 THEN
290 IF handle%>0 THEN y% =h%+92 ELSE
y% =b%14+h%
300 SYS"Wimp_CreateMenu",,m%,I%<64
,y%
310 menuptr% =m%:menufree% =mb%
320 ELSE menufree% =menuptr%
330 ENDIF
340 m%
350 :
360 DEFPROCMenuitem(text%)
370 IF text%="" THEN menuptr%1-24=(men
uptr%1-24)OR&80:ENDPROC
380 IF menuptr%+24 > menuend% THEN ERR
OR "Menu area full"
390 LOCAL i%,i%,flg%,subptr%,L%,I%:flg
% =400
400 I% =INSTR(text%,"")
410 IF RIGHT$(text%,1)="#" THEN text% =
LEFT$(text%,LENtext%-1):flg% +=&02:h% +=26
420 IF I%>0 THEN subptr% =EVALMID$(text%,i
%+1):text% =LEFT$(text%,I%-1) ELSE subptr%
=-1
430 menuptr%10 =flg%:menuptr%14 =subptr%
:menuptr%18 =&0000021
440 IF LEFT$(text%,1)="$" THEN
450 I% =menuptr%18+&04
460 menuptr%18 =&108
470 I% =INSTR(text%,"")
480 IF I%>0 THEN VALMID$(text%,I%+1):
text% =LEFT$(text%,I%-1) ELSE I% =12
490 menuptr%12 =EVALMID$(text%,2)
500 menuptr%116 =-1:menuptr%120 =L%
510 text% =STRING$(L%, " ")
520 REMIF w%>20 THEN w% =20
530 ELSE
540 IF LEFT$(text%,1)="#" THEN
550 text% =RIGHT$(text%,LENtext%-1)
560 I% =menuptr%18+&08
570 ENDIF
580 IF LENtext%<=12 THEN
590 $ (menuptr%+12) =text%
600 ELSE I% =Fmworkspace(LENtext%+1):$
I% =text%
610 menuptr%12 =I%:menuptr%116 =-1:me
nuptr%120 =LENtext%+1
620 menuptr%18 =menuptr%18 OR &100
630 ENDIF
640 IF LEFT$(text%,1)="#" THEN w% =LENtext%
650 ENDIF
660 menuptr%1 =24
670 ENDPROC
680 :
690 DEFFNworkspace(L%):DIM L% I% = L%
700 I% =1:I% =1:I% =INSTR(menu$+sep$,sep$,
I%)
710 I% =MID$(menu$,I%,I%-I%+1)
720 I% =MID$(menu$,I%,I%-I%+1)
730 I% =MID$(menu$,I%,I%-I%+1)
740 :
750 DEFPROCWimpTick(b%,n%)
760 b%1(18-24*n%) =b%1(28+24*n%)EOR&01
770 ENDPROC
780 :

```

```

790 DEFPROCWimpSelect(menu$,RETURN m$,
RETURN but%)
800 SYS"Wimp_GetPointerInfo",,b%+64:bu
t% =b%172
810 SYS"Wimp_DeCodeMenu",,menutop%,men
u$,STRING$(200," ")TO,,m$
820 IF m$="" THEN ENDPROC
830 IF m$="Quit" PROCWimpEnd:END
840 ENDPROC
850 :
860 DEFFNWimpErr(t$):LOCAL K%
870 I% =0:$(b%+4) =t%+CHR$0:SYS"Wimp_Re
portError",b%,3,taskn% TO ,K%
880 K%
890 :
900 DEFPROCWimpStop:ONERROROFF
910 SYS"Wimp_DragBox",,-1:b% =ERR
920 IF ERR=52 $(b%+4) =REPORT%+CHR$0 EL
S$(b%+4) =REPORT%+ " at line "+STR$ERL+C
HR$0
930 SYS"Wimp_ReportError",b%,1,taskn%
940 PROCWimpEnd:END
950 :
960 DEFPROCOpenWin(h%,x%,y%,xh%,yh%,
xoh%,yoh%,f%)
970 I% =h%:b%14=x%:b%18=y%:b%12=xh%:
b%16=yh%:b%120=xoh%:b%124=yoh%:b%128=f%
980 SYS"Wimp_OpenWindow",,b%
990 ENDPROC
1000 :
1010 DEFPROCcloseWin(w%):I% =w%
1020 SYS"Wimp_CloseWindow",,b%
1030 ENDPROC
1040 :
1050 DEFPROCDeWin(w%):I% =w%
1060 SYS"Wimp_DeleteWindow",,b%
1070 ENDPROC
1080 :
1090 DEFPROCWimpSE(w%,A%,B%,C%,D%)
1100 I% =A%:b%14=B%:b%18=C%:b%12=D%:SY
S"Wimp_SetExtent",w%,b%
1110 ENDPROC
1120 :
1130 DEFPROCWimpNewTitle(w%)
1140 I% =w%:SYS"Wimp_GetWindowOutline",
,b%
1150 SYS"Wimp_ForceRedraw",-1,b%14,b%1
6-44,b%112,b%116
1160 ENDPROC
1170 :
1180 DEFPROCWimpOT(T$)
1190 SYS"Wimp_OpenTemplate",,T$
1200 ENDPROC
1210 DEFPROCWimpCT:SYS"Wimp_CloseTempla
te":ENDPROC
1220 DEFPNwimpLT(I%,N%,T$)
1230 SYS"Wimp_LoadTemplate",,I%,I%,N%,T
RUE,T$,0 TO ,N%,,,I%
1240 IF I%>0 PROCWimpCT:I% =0:$(b%+4) =
Template "+T$":not found+CHR$0:SYS"Wim
p_ReportError",b%,1,taskn%:PROCWimpEnd:E
ND
1250 N%
1260 DEFPROCWimpCW(b%):LOCAL R%
1270 SYS"Wimp_CreateWindow",,b% TO R% =
R%
1280 :
1290 DEFPROCWimpSSave:LOCAL A%,B%,C%,D%
1300 I% =SaveAs%:b%14=0:SYS"Wimp_GetIco
nState",,b%
1310 b%132=SaveAs%:SYS"Wimp_GetWindowS
tate",,b%+32
1320 A% =b%136+b%18:B% =b%148+b%112:C% =b%
136+b%116:D% =b%148+b%120
1330 b%18=A%:b%112=B%:b%16=C%:b%12=D%
1340 b%124=0:b%128=0:b%132=&7FFFFFFF:b%1
36=&7FFFFFFF
1350 b%14=5:SYS"Wimp_DragBox",,b%
1360 ENDPROC
1370 DEFPROCWimpDoSave(fn$,T%)
1380 SYS"Wimp_GetPointerInfo",,b%
1390 b%120=128:b%132=0:b%136=1:b%140=b%
112:b%144=b%116:b%148=b%152=b%14
1400 b%156=0:b%160=T%:$(b%+64) =fn$+CHR$
0
1410 SYS"Wimp_SendMessage",17,b%+20,b%1
40,b%144
1420 ENDPROC
1430 DEFPROCWimpAckSave(b%16:3:SYS"Wim
p_SendMessage",17,b%,b%120,b%124:ENDPROC
1440 :
1450 DEFPROCHourOn:SYS"Hourglass_On":EN
DPROC
1460 DEFPROCHourSmash:SYS"Hourglass_Sma
sh":ENDPROC
1470 :
1480 DEFFNGetStr(n%):LOCAL n$
1490 IF n%<=32 =n$
1500 REPEAT:n$ =CHR$(n%):n% +=1:UNTIL ?
n%<=32=n$
1510 DEFPROCPutStr(n$,n%)
1520 n$ =CHR$0:LOCAL I%
1530 FOR I% =1 TO LEN(n%):n% =ASC(MID$(n
$,I%)):n% +=1:NEXT
1540 ENDPROC
1550 :
1560 DEFFNLeaf(n%):LOCAL I%
1570 I% =LEN(n%):WHILE I%>0 AND MID$(n$,
I%,1)<" ":I% -=1:ENDWHILE
1580 I% =MID$(n$,I%,1)

```


Software for all Acorn Computer Users!

Excellent mail order service for Archimedes, BBC B, Master 128, Master Compact & Electron



Unused BBC B's

High Specification BBCs for only £176.25!
(Includes, DFS, Econet, a word Processor & Speech ROMs)

Variety of special bundle packs available to include a BBC B & Cumana 5.25" Disc Drive from only £279.95

Please write or phone for further information

Printers

Panasonic KX-P1081	9pin dot matrix	£159.95
Panasonic KX-P1170	9pin dot matrix	£169.95
Panasonic 1124i	24pin dot matrix	£254.95
Seikosha 1900 Plus	9pin dot matrix	£121.95
Seikosha SP2400	9pin dot matrix	£159.95
Seikosha SL92	24pin dot matrix	£249.95

Prices include VAT, cable & delivery!

(Delivery free UK mainland only, excluding Scottish Highlands)

** Full specifications available on request **

BBC & ELE

Send for our Catalogue! BBC/ELE B-Disc Cppt

Arcade Soccer	6.50	8.50	8.95
E-Type	6.50	9.75	10.50
Elite	9.95	11.95	15.95
Emlyn Hughes Quiz - New! (BBC)	8.95	-	-
Exile	9.95	11.95	15.95
Fun School 2 (0-6 yrs)	8.95	11.95	12.50
Fun School 2 (6-8 yrs)	8.95	-	12.50
Fun School 2 (8+ yrs)	8.95	11.95	-
Fun School 3 (0-5 yrs) (BBC only)	9.95	13.95	-
Fun School 3 (5-7 yrs) (BBC only)	9.95	13.95	-
Fun School 3 (7+ yrs) (BBC only)	9.95	13.95	-
Holed Out	8.50	9.75	10.50
Holed Out Extra Crses 1	6.50	7.75	8.50
Holed Out Extra Crses 2	6.50	7.75	8.50
Loopz	8.79	11.95	-
Master Break	7.95	9.95	11.95
Micro Power Magic 1 *	5.95	6.95	7.75
Micro Power Magic 2 *	5.95	6.95	7.75
Micro Power Magic 3 *	-	6.95	-
Mini Office 2 * (BBC only)	10.95	13.95	17.95
Mini Office 2 M128 *	-	15.95	-
Nevryon	-	9.75	10.50
Play it Again Sam 1 to 10 (Each)	6.95	8.95	10.50
Play it Again Sam 11 to 14 (Each)	7.95	9.95	11.95
Play it Again Sam 15 & 16 (Each)	9.95	11.95	15.95
Q-Master New! (BBC Only)	-	12.95	13.95
Repton infinity	9.95	11.95	15.95
Sim City	9.95	11.95	15.95
Speech (BBC only)	7.95	9.95	11.95
Superior Collection 1 (BBC only)	6.95	8.95	10.50
Superior Collection 2 (BBC only)	6.95	8.95	10.50
Superior Collection 3 (Ele only)	6.95	-	-
Tank Attack (40t)	9.95	11.95	-
U.I.M. (Needs 16k Sideways RAM)	-	12.95	14.25
White Magic 1 or 2 (each)	6.50	9.75	10.50

(* Please state 40t or 80t disc)

CUT

(AU62)

Please send me your
FREE CATALOGUE!

Name

Address

Postcode

☐ Archimedes
A3000/A5000

☐ BBC B/B+/
Master 128/Cppt

☐ Electron

Arch/A3000/A5000

Arcade Games

Aggressor New!	19.95	16.95
Bambuzle	24.95	21.95
Blitz	24.95	21.95
Bobby Blockhead New!	19.95	16.95
Break 147 & Superpool	34.95	32.95
Cartoon Line	24.95	19.95
Cataclysm	25.95	24.95
Chuck Rock	25.99	25.99
Elite	39.95	39.95
Grievous Bodily 'ARM	25.95	24.95
James Pond	25.99	25.99
Karma - The Flight Trainer	24.99	23.95
Lemmings	25.99	25.99
Loopz	24.99	17.50
Mad Professor Mariarti	20.39	15.95
Pesky Muskrats New!	25.99	23.95
S.W.I.V. New!	25.95	25.95
Top Banana	25.99	17.95
X-Fire New!	25.95	24.95
Zelanites The Onslaught	24.94	19.95

"Mind" Games

Chess 3D	19.95	19.95
Simulation Games		
3D Construction Kit	49.99	44.95
Air Supremacy	24.95	21.95
Chequered Flag	24.95	21.95
Chocks Away Compendium	39.95	36.95
Dreadnoughts	34.95	31.95
Flight Simulator Toolkit	44.95	41.95
Mig-29M Super Fulcrum	39.99	31.95
Saloon Cars	25.95	24.95
Waterloo	24.95	21.95

Adventure Games

Enter the Realm	25.95	24.95
Legend of the Lost Temple	24.95	21.95
Pandora's Box	25.95	24.95
Tower of Babel	24.99	17.50
Sport Games		
Manchester Utd Europe	25.99	25.99
Microdrive World Edition	29.95	26.95
Jahangir Khan W. Ch. Squash	25.99	17.95
World Champ. Boxing Mgr	25.53	21.95

Compendiums

Magnetic Scrolls Collection	34.99	29.95
Real McCoy	29.95	27.95
Real McCoy 2	29.95	27.95

Leisure/Various

Presenter GTI	82.19	73.95
Rhapsody 2	61.95	51.95
Score Draw	61.95	54.95
Speech	19.95	15.95
Titler	149.95	134.95
Tracker	49.95	41.95
Trivial Pursuit	30.64	25.95
Touch-Type (New Typing Tutor)	51.04	45.95

Utilities

Compression	57.57	49.95
Desktop Assembler	175.08	149.95
Euclid	70.00	57.95
Graph Box Professional	151.58	129.95
Hard Disc Companion 2	52.88	47.95
Illusionist	99.95	89.95
Investigator Rel 2	27.95	23.50
PC Emulator V1.6	116.33	116.33
Pipedream 4	230.30	204.95
Render Bender 2	135.00	114.95
Shape FX	11.75	11.75
Tracer	61.25	51.95

Word Processors

Easiwriter	176.25	149.95
Interword	34.07	28.95
Educational		
Best Four Maths Programs	52.88	44.95

SRP SALE

19.95	16.95
24.95	21.95
24.95	21.95
19.95	16.95
34.95	32.95
24.95	19.95
25.95	24.95
25.99	25.99
39.95	39.95
25.95	24.95
25.99	25.99
24.99	23.95
25.99	25.99
24.99	17.50
20.39	15.95
25.99	23.95
25.95	25.95
25.99	17.95
25.95	24.95
24.94	19.95

19.95	19.95
49.99	44.95
24.95	21.95
24.95	21.95
39.95	36.95
34.95	31.95
44.95	41.95
39.99	31.95
25.95	24.95
24.95	21.95

25.95	24.95
24.95	21.95
25.95	24.95
24.99	17.50
25.99	25.99
29.95	26.95
25.99	17.95
25.53	21.95

34.99	29.95
29.95	27.95
29.95	27.95

82.19	73.95
61.95	51.95
61.95	54.95
19.95	15.95
149.95	134.95
49.95	41.95
30.64	25.95
51.04	45.95

57.57	49.95
175.08	149.95
70.00	57.95
151.58	129.95
52.88	47.95
99.95	89.95
27.95	23.50
116.33	116.33
230.30	204.95
135.00	114.95
11.75	11.75
61.25	51.95

176.25	149.95
34.07	28.95
52.88	44.95

Best Four Language Programs	52.88	44.95
Children's Graphics Pack	19.95	17.95
Coffee (9-15yrs)	32.84	29.95
Converta-Key	19.95	17.95
DataWord	19.95	17.95
Decorated Alphabet Pack	19.95	17.95
Farmer Giles 2	20.39	17.35
First Words & Pictures	25.85	21.95
Flight Path	32.84	29.95
Freddy Teddy (3-7yrs)	23.44	19.95
Freddy Teddy's Adventure	19.95	17.95
Fun School 2 0-6/6-8/8+ yrs - each	20.99	15.95
Fun School 3 0-5/5-7/7-11 yrs - each	24.99	21.95
Fun School 4 - Release postponed		

History Costume Library	19.95	17.95
House of Numbers (6-13yrs)	25.85	21.95
Imagine	39.95	36.95
Landmarks - 2nd Wld War	28.20	27.95
Little Red Riding Hood	17.95	15.95
Letters & Pictures (6-8yrs)	23.50	19.95
Maps & Landscapes (9-14yrs)	25.85	21.95
Mega Maths (A Level)	25.22	23.95
Micro English (8yrs - GCSE)	25.22	23.95
Micro French (8yrs - GCSE)	25.22	23.95
Micro Maths (11yrs - GCSE)	25.22	23.95
Money Matters	19.95	17.95
Nature Library	19.95	17.95
Numbers/Pictures (4-6+yrs)	23.50	19.95
Ollie Octopus Sketchpad	16.39	14.95
Picture Book	19.95	17.95
Pirate New!	23.50	19.95
Prehistoric Animals Pack	19.95	17.95
Primary Maths (3-12yrs)	25.22	23.95
Puncman 1&2 (7-13+)	23.50	19.95
Puncman 3&4 (8-14+)	23.50	19.95
Puncman 5, 6, & 7 (8-15+)	23.50	19.95
Revelation	89.30	89.30
Reversals	23.50	19.95

Search & Rescue (9-15yrs)	32.84	29.95
Sesame St. Number Count	19.99	17.95
Sesame St. Letters for you	19.99	17.95
Shylock Gnomes	21.74	19.95
Spelling Week By Wk (6-14)	25.85	21.95
Spellbook (4-9yrs)	25.50	21.95
Target Maths	19.95	17.95
The Playground	35.19	32.95
TinyLogo/Tiny Draw (4-9yrs)	35.19	31.95
Tools Graphics Library	29.95	27.95
World Geography Maps Pack	29.95	27.95
World Wildlife Pack	19.95	17.95
Yes Chancellor 2	27.03	25.95

Communications		
ArcComm V2	63.45	63.45
Arcterm 7	79.95	67.95
Hearsay 2	88.13	79.35
Desktop Publishing		
Clip Art Set 1 or 2 (Each)	35.19	29.95
Impression 2	198.57	145.95
Impression 2 - Borders	15.00	12.75
Impression Junior	105.69	81.95
Ovation	116.33	91.95

Peripherals & hardware		
Arch Joystick Interface (Serial P)	28.14	26.95
Clare Micro Mouse	32.00	27.50
Graphics Enhancer	222.08	194.95
Sound Samp. & Midi Card	81.08	71.95
Computer Aided Design		
SolidTOOLS	375.00	337.50
Instructional Videos		
Up & Running	14.95	13.95
Text Processing	14.95	13.95
Data Handling	14.95	13.95
Art/Graphics	14.95	13.95

(SRP = Suggested Retail Price) All prices include VAT @ 17.5% Most titles are A5000 compatible - however please call to check

Software Bargains & Mercury Games

Dept AU62, C/O Northwood House, North Street, LEEDS LS7 2AA

TEL: 0532 436300 FAX: 0532 423289

* Access/Visa Welcome
* Please add 95p P&P (Europe £2.50, Outside Europe £4.50)
* All prices include VAT @ 17.5%
* Goods despatched within 48 hrs, (subject to availability)

* Educational discount of 30% off SRP (not Sale price) available on most Archimedes software; Official Order No. or school headed notepaper required - minimum order value £30.00 for invoicing, otherwise cheque with order.
(Prices are correct at the time of going to press, E&OE)

A LITTLE SUM-THING

This puzzle is from *BAU* reader **Ian Gleghorn** of Seaham, County Durham who receives £20 for his troubles. Consider the small spreadsheet on the right. It consists of four columns A-D and four rows 1-4. In the top left cell is the constant value 3. All the other cells have their values determined by the equations shown. For example, D1 has the value $2 \times A1$ which is 6. What is the value of cell D4? And what number must be entered in place of the 3 at A1 for the value of D4 to be zero?

	A	B	C	D
1	3	$B4+C4$	$(A4+B4)/A3$	$2 \times A1$
2	$A1+D1$	$A3+C2$	$A1+2$	$(B1/C1)+6$
3	$A1+1$	$(B1+A4)/C2$	$D2/C2$	$C2 \times (A3+B4)$
4	$D3-A2-B2$	$D1-5$	$(B2/A1)+A3$	$(D2+C3)/A1$

VOWEL TROUBLE

Below is a list of six-letter words. At least, they were six-letters but due to an oversight the vowels have been missed out. As you can see, each word originally contained four vowels, so can you reconstruct them? Short clues are provided.

TP	Paradise	RL	Antenna
RP	Land mass	QT	Balance
GN	Lizard	LS	Negotiate
CC	Flowering plant	DN	Element
NS	Sickness	BG	Dance
NS	Discomfort	LG	Alliance

KEYWORD SEARCH

T	R	H	E	F	A	G	H	E	L	V	T	S	A	B	G
E	S	N	C	O	S	B	A	T	A	D	R	A	W	G	C
E	M	E	S	R	E	S	I	N	P	U	T	D	N	E	O
B	E	L	S	E	N	T	I	L	D	N	B	P	U	T	P
T	C	L	G	M	V	N	H	W	I	D	T	H	H	W	R
S	H	A	T	A	E	P	E	R	M	T	N	E	E	F	E
Q	A	M	L	P	L	K	P	U	A	E	N	U	W	A	C
W	I	S	O	L	O	P	L	O	T	D	R	U	O	L	N
T	N	E	C	V	P	O	J	L	R	X	V	F	E	S	I
G	H	Y	G	P	E	T	S	O	U	R	E	A	D	E	R
A	E	R	I	E	S	S	S	C	E	D	R	N	L	S	P

How many Basic keywords can you find in the grid above? They may run in a straight line in any direction including diagonally. We found 40 - how did you get on?

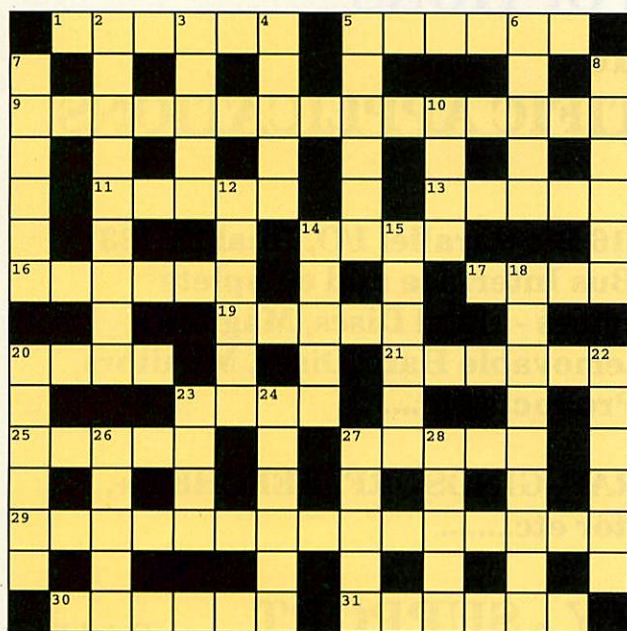
MAY'S SOLUTIONS

Hex-travaganza

$(((((\&7D + \&6A) - \&3B) \text{ OR } \&B6) \text{ AND } \&F8) \text{ EOR } \&E4) = \&5C$

Back-words

RATING from *DIGNITARY*, SENORA from *BARONESS*, TARGET from *INTEGRATE*, FITTER from *PRETTIFY*, SECEDE from *PREDECESSOR*, SILAGE from *LEGALISE*. Other solutions were available.



Send your entries to *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ to reach us by Friday June 12 1992. Photocopies of your solution are acceptable. The solution (and winner) will be published in the August issue. The winner of April's crossword (answer shown right) is Mr Prinner of Millon. Chambers English Dictionary, 1988 edition, is recommended.

BBC ACORN USER CRYPTIC CROSSWORD

Across

- 1,5 Ernie's choice? (6,6)
- 9 What holds up those wonderful buildings? (15)
- 11 Stuck in the slammer? Use Samson's tricks! (5)
- 13 Treasurer loses royal pouch (5)
- 14 Alternative keyword (4)
- 16 Mother vessel? (6)
- 17 Mushy peas found in church recess (4)
- 19 Uniform made from material of questionable quality (5)
- 20 "Cash on delivery, egghead! ...or it gets broken!" (4)
- 21 Let those in class know (6)
- 23 Process 1 part in 18 (4)
- 25 It's unpleasant and not totally legal (5)
- 27 Short verse rhymes (5)
- 29 Might this help learner face menu structure? (9,6)
- 30 Pity about road worker... (6)
- 31 ...worker who met horrible end on motorway after starting to hum song! (6)

Down

- 2 Shorthand? Habsolutely! (9)
- 3 A game with runs (5)
- 4 Use Macintoshes occasionally for such homework (5)
- 5 Indifferent, heartless, nervy? (6)
- 6 To offend or "end up inside" is a mistake (5)

- 7 A track for climbing up (6)
- 8 The key to freedom (6)
- 10 Looking back, Jools Holland debuted in this! (4)
- 12 "10+10" stretches spaceman to limit (6)
- 14 Arm oneself in a fit of pique (5)
- 15 Section of span over railway is a smooth curve (6)
- 18 Carelessly reproduce section of program (9)
- 20 Heads meeting (often around tables) (6)
- 22 I hold game up to set course (6)
- 23 Slanderous comment found in musical work (4)
- 24 To serve all your Masters' needs? (6)
- 26 AU's number? (5)
- 27 A definite thank-you letter (5)
- 28 Respond to touching performance (5)

A	R	T	I	S	A	N		C	O	P	Y	I	N	G
F	L	I	G	H	T	S		W		A	N	I		
F	L	I	G	H	T	S		I	M	U	L	A	T	O
E	G	E	N							M	E	E		
C	H	O	I	R	S			D	D	E	G	R	E	
T	N		E	N	C	O	D	E	D	P	R			
S	O													
I	M		P	O	R	T	S	K	A	T	E	R		
A	E		K	C	O	T	T	V						
S	T	A	E	R	O	S	O	L	A	I				
S	C	R	O	L	L	S		P	E	W	T	E	R	
U	I		M					N	I		U			
M	I	C	R	O	P	R	O	C	E	S	S	O	R	S
E	A		S											
D	E	L	E	T	E	D		M	I	S	U	S	E	S

Redwood Publishing

– publisher of twenty high-profile magazines including BBC Good Food, M&S Magazine and Acorn User – requires a

Computer Network and Training Manager

to continue the development of its extensive Econet.

To do the job, you'll have to be:

- bright, sociable, responsible and flexible
- willing to help 100 demanding journalists get the best from their micros
- experienced on BBC micros, Econet management, View family software and Archimedes machines

The post could suit someone leaving full-time education or a more experienced candidate. Experience of training, knowledge of SJ Research file servers, and an interest in magazines would be advantageous.

There will be the chance to be involved with desktop publishing and Apple Macs, and with other system developments at Redwood. Salary will be appropriate to experience, and there are good opportunities for career development.

To apply, write to Giselle Mould at Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ, enclosing a full CV.

STAFF VACANCY

We need an Accountant to take over the day-to-day running of our accounts department.

Though not necessarily qualified, you will need to be intelligent and able to demonstrate your experience in all areas up to the preparation of draft final accounts.

Your responsibilities will also include sales and purchase order processing, stock and credit control.

Familiarity with a leading Archimedes spreadsheet will be a great advantage.

In spite of our rapid growth we are still a small company, so you will be a key member of the team in our attractive offices on the West Wirral coast.

Remuneration will be according to ability, and we will help with relocation if appropriate.

Please write to us enclosing your CV.



ICS
1 Kington road, West Kirby
WIRRAL, Merseyside
L48 5ET

ACORN ARCHIMEDES COMPUTERS EXPANSION OPTIONS FOR INDUSTRIAL & SCIENTIFIC APPLICATIONS

HARDWARE - IEEE488 Interface, 16 Bit Parallel I/O, Dual RS423 Serial Interface, 12 Bit ADC, STE Bus Interface and complete range of STE Bus Boards, SCSI Devices - Hard Discs, Magneto-Optical Drives, Tape Streamers, Removable Hard Discs, Monitors, Printers, Plotters, Plus all Acorn Products etc.....

SOFTWARE - GINO-F 3D, GINOGRAF, GINOSURF, HERSHEY +, VIEWGRAF, VIEWSURF, Termulator etc.....



ADVICE - SUPPLY - SUPPORT
INTELLIGENT INTERFACES LTD

**Established
1981**

PO BOX 80, Eastleigh, Hants, SO5 5YX.
TEL 0703 261514 FAX 0703 267904

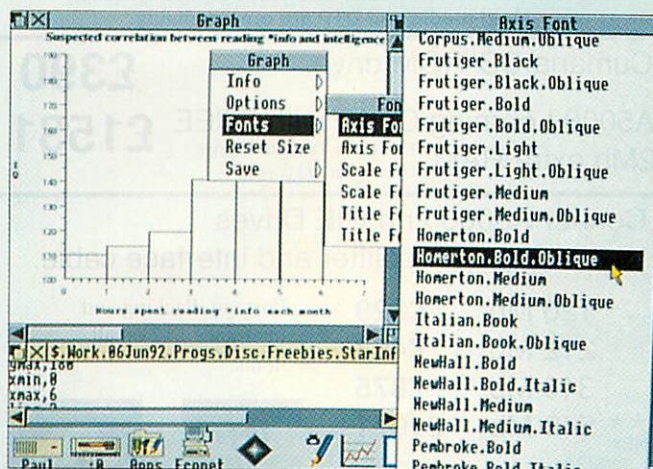
FREE

PROGRAMS

WHEN YOU SUBSCRIBE TO BBC ACORN USER



Change the whole look of your Desktop with this special utility, only available to BAU subscribers. Turn to *Disc, page 78, for more details



Amaze your friends and business associates – soup up your 32-bit graphic output with this upgrade to Graph Plus. See *INFO, page 57, for details

PLUS SPECIAL LUXURY BINDER OFFER

THE BEST SELLING ACORN COMPUTER MAGAZINE

Every month, *BBC Acorn User* brings you all the news, reviews and features covering the world of Acorn. That is why we are the best selling magazine in the Acorn marketplace. Whether you own a BBC B or the latest Archimedes A5000, there is something for you.

As well as up-to-the-minute news on the latest Acorn hardware and software, our regular columnists cover new developments in the areas of education, communications and graphics. Add to that the best in reviews and features and you have a magazine that no Acorn user should be without.

FREE MONTHLY DISCS

We aim to bring readers the best programs for their machines. These are listed on our yellow pages so that the keen programmers out there can type them in. However, there is an easier way – you can load them straight in to your machine from the monthly disc which we send **free** to UK subscribers. The monthly subscription costs just £22.95 and the free disc contains all of the programs featured in each issue, plus

additional utilities we think you'll find useful. The programs can help you get maximum enjoyment from your Acorn machine.

To obtain the 12 discs free with each UK subscription, just tick the relevant box below. The 3.5in disc is compatible with the BBC A3000/Archimedes, and BBC B/Master/Compact with 3.5in drive and ADFS. The 5.25in disc is 40/80-track DFS and is suitable for BBC B/B+/Master computers with 5.25in drive.

BINDER OFFER

To keep your copies of *BBC Acorn User* in pristine condition, we have produced a special binder. Finished in white with our logo, the binder will hold 12 issues. You don't have to subscribe to obtain a binder – all you have to do is tick the relevant box below.

Each binder costs £5.95.

WHAT TO DO

Send the order form with your remittance to: *BBC Acorn User* Subscriptions, PO Box 66, Wetherby LS23 7HL. Or ring the credit card hotline number: (0937) 842489.

BBC ACORN USER ORDER FORM

Name.....

Address.....

Postcode.....

Signature.....

Please tick if you are taking out:

☐ A new subscription

☐ A renewal of a current subscription

SUBSCRIPTION OFFER

	Magazine only	3.5in disc	5.25in disc
UK	N/A	<input type="checkbox"/> £22.95	<input type="checkbox"/> £22.95
Mainland Europe	<input type="checkbox"/> £35	<input type="checkbox"/> £49	<input type="checkbox"/> £44
Rest of World	<input type="checkbox"/> £45	<input type="checkbox"/> £69	<input type="checkbox"/> £64

BINDER OFFER

☐ Please send me..... binders at £5.95 each

BACK ISSUES/DISCS OFFER

Month.....Year ☐ 1990 ☐ 1991 ☐ 1992

Magazine only ☐ £1.95 Discs ☐ £4.95 (5.25in) ☐ £5.95 (3.5in)

Overseas orders add £1 (Europe) and £3 (rest of the World)

I enclose a cheque/PO (made payable to Redwood Publishing Ltd) for a total of £.....

Access/Visa card no..... Exp date.....

UNIQUEway

Acorn Replay

Full details of our Acorn Replay compression service available on request. Normal turnaround 72 hrs for 12.5 fps CD-ROM Movies. Educational enquiries especially welcome. Demonstration CD-ROM and discs available soon.

OFFICIAL ACORN REPLAY COMPRESSION CENTRE
Authorised Acorn Dealer and Value Added Reseller.
 Multi-media and DTP are our speciality.

Cumana CD-ROM drive. **£390**

A5000 Learning Curve with FREE **£1531**
 2Mb extra RAM Free Home Demonstration in Glamorgan and Gwent.

Conner A5000 2nd IDE Drives
 including power splitter and interface cable.

120 Mb **£329**

212 Mb **£483**

340 Mb **£875**

**** 540 Mb £1071**

NEW
 All prices exclude VAT.
 E&OE

Postage, Packing and
 Insurance £12 on all
 items.

VISA

Access

Mail order Telephone 0222 615782 or 0223 410138 (p.m only)

RETAIL SHOP NOW OPEN
42 CRWYS ROAD, CARDIFF

TELEPHONE 0222 644611 FAX 0222 644622
 Thursday 10-8, Friday 9.30-6, Saturday 9.30-6.

BEEBUG Magazine

the only magazine still devoted solely to the BBC Micro
 and the Master 128

**Celebrates the start of its
 11th year of publication**

BEEBUG was the first magazine ever published
 to cater for BBC enthusiasts, and is still going
 strong after 10 successful years.

BEEBUG offers a wealth of information:
 from articles on how to write Basic programs to
 ready-to-use utilities and complete stand-alone
 applications. BEEBUG also offers frequent 'fun'
 programs and entertaining games.

If you want to find out more, write to us for a **FREE**
BEEBUG magazine or phone on **0727 40303**.
 Please quote A6 to receive your free magazine.

**RISC Developments, 117 Hatfield Rd, St. Albans, Herts
 AL1 4JS**

Hard Disc Drives

Superb SCSI hard disc drive with Oak 16 bit controller, fully tested and ready to use.

Internal Drives

300/400/500/5000

20Mb

45Mb

80Mb

100Mb

200Mb

£199.00

£245.00

£345.00

£439.00

£729.00

External Drives

300/400/500/3000/5000

20Mb

45Mb

80Mb

100Mb

200Mb

£279.00

£325.00

£425.00

£519.00

£809.00

Bits and Bobs

We have managed to procure a selection of useful bits and bobs which would come in handy for people wanting to assemble their own equipment. All equipment is new unless otherwise stated, and cases are typically 'end of line' stock from large manufacturers.

Metal Cases Suitable for: (PSU/Fan NOT included)

3 1/2" Hard Disc/Fan/PSU

£12.75

5 1/4" Hard Disc/Fan/PSU

£18.75

3 1/2" Floppy Disc Drive

£6.00

3 1/2" Dual Floppy Drive

£12.00

5 1/4" Floppy Disc Drive

£7.00

5 1/4" Dual Floppy Drive

£14.00

3 1/2" Floppy Drive/PSU

£12.00

3 1/2" Dual Floppy/PSU

£18.75

5 1/4" Floppy Drive/PSU

£14.00

5 1/4" Dual Floppy/PSU

£20.75

Floppy Discs

3 1/2" Unbranded 10 off

£6.00

3 1/2" Unbranded 25 off

£13.75

3 1/2" Unbranded 100 off

£50.00

A3000 Monitor Stand

£12.00

A3000 User Analogue Port

£42.00

A3000 User Analogue Port + floppy disc buffer

£52.50

A3000 RAM Upgrade to 2Mb

£45.00

A3000 RAM Upgrade to 4Mb

£145.00

BBC B Plastic Case

£15.00

BBC Master Plastic Case

£25.00

Master Power Supply

£42.00

Master Keyboard

£45.00

3 1/2" Citizen Floppy (A3000/A400)

£45.00

5 1/4" Switchable Floppy

£55.00

Prices exclude carriage (£10)
 and VAT (17.5%)
 Access and Visa welcome.

Warehouse
 Where else

68 Green Street
 Great Gonerby
 Grantham
 Lincolnshire
 NG31 8LE
 Tel/Fax 0476 593110

A video digitiser is perhaps the ultimate input device for an Archimedes. With its high resolution display and powerful number crunching abilities, the Arc is perfectly suited to image manipulation, not to mention the fun of adding TV scenes, or shots of friends and family, into your *Paint* files.

A video digitiser will take a TV screen image and convert it to a form suitable for display and manipulation on a computer. It does with live video signals what a scanner does for photographs. However, unlike scanners, video digitisers are pretty simple affairs, without the need for expensive optics, paper feed and so on, providing a way into image input that is immensely affordable.

A digitiser can 'grab' frames from most video sources into memory and display them on the screen to be stored, printed, or manipulated like any other sprite. Of course, any video digitiser requires a source of video signals to digitise. You cannot simply connect up your TV aerial to a digitiser because it requires a different kind of video signal. However, pictures from broadcast TV can be grabbed by using a video recorder: most models have a composite video output of one kind or another. Satellite TV receivers, on the other hand, produce exactly the right composite video signals for grabbing pictures 'off air'.

Both of these methods are fine for a while, but you are still at the mercy of the broadcasters and can only grab what they provide. The ideal solution is to invest in a video camera of some kind and the watchword here is quality – the better the camera is, the better the digitised images will be, whether you are talking about colour or monochrome cameras and we will examine some of the options in more details later on.

The digitiser itself samples the video signal at high speed, storing a value equivalent to the brightness at that point in the Archimedes' memory, for display on the screen. The quality of the grabbed image depends on the resolution of the stored image and the number of grey shades, or colours,

available for each pixel.

Of course, just as important as the hardware is the software which drives it and makes use of the images obtained. The usual technique is to convert the video images into sprites, monochrome or colour, alter them using an art package such as *Paint* and finally use them – for instance in a desktop publishing package.

To see this in action, we tested out two digitisers for the Archimedes. Vision is the latest mono digitiser from HCCS and Vidi is a colour digitiser from Rombo.

VIDI £149

The Vidi card is a colour video digitiser. All this means is that it grabs three frames one after the other, looking only at the red, green and blue content in turn. But this does require extra circuitry and puts the price of the Vidi up to £149.

However, it is still simple to fit and use. This is a half-width podule which fits into any empty slot. The card produces no message on a *Podules command, but a blank line on the listed expansions proves that all is well.

At the rear of the podule are three controls for brightness, saturation (colour) and contrast. It must be said that the saturation control seemed to have little effect on the signal when the review module was tried. Also on the back panel are two input sockets – a phono connector for composite video and an S-VHS terminal – and a trigger socket (for external triggering of the frame-grabbing process).

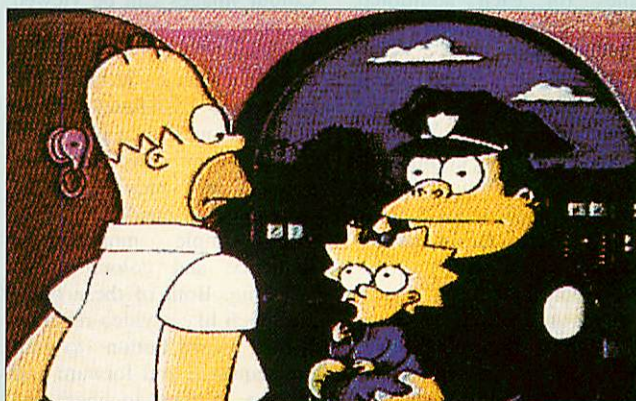
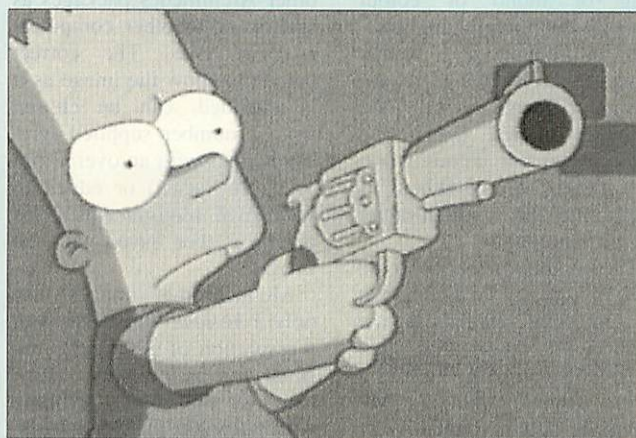
The advantage of the S-VHS terminal is largely theoretical. Little difference in the quality of grabbed images was found when feeding the two sockets. The board is well made, the only small problem being the special side pieces, which must be bolted on to the Archimedes case.

The software for the Vidi card is on two disks. The first has three applications – *Vidi*, *BVidi* and *Colour* – a complete System directory with three special *Vidi* modules, some pre-prepared palettes and some examples sprites. The second disk contains a slideshow program for displaying your grabbed frames and further

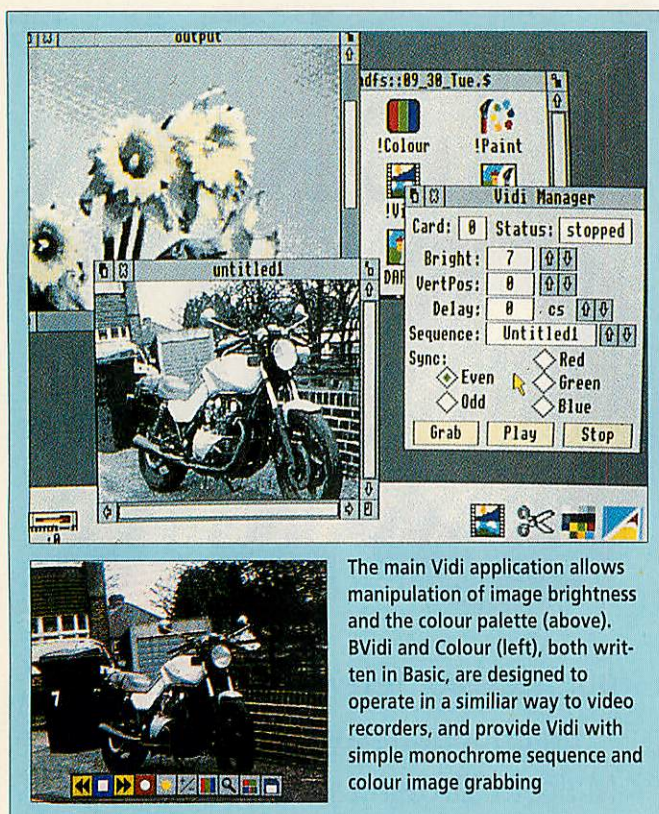
VISION ON

Your video or television screen can be an abundant source of images. Malcolm Brown takes a look at two digitisers for the Archimedes

VISION & VIDI



Vision (top picture) and Vidi (lower picture) are two digitisers that can work with the Archimedes. Vision works in mono, whereas Vidi is colour, but both can grab images of either a video or satellite TV screen



The main Vidi application allows manipulation of image brightness and the colour palette (above). BVideo and Colour (left), both written in Basic, are designed to operate in a similar way to video recorders, and provide Vidi with simple monochrome sequence and colour image grabbing

examples. The *Vidi* application is the heart of the system. This allows quite a sophisticated level of control over the grabbing of monochrome or colour images. All images are grabbed in sequences – either sequences over time of monochrome images or the sequence of red, green and blue images for colour work. All images are grabbed as mode nine sprites which rather limits their quality.

The number of monochrome images, that can be grabbed at any one time, depends on the memory in your Arc but, roughly, you can fit around a dozen frames into a 1Mb machine and a further 21 frames for each additional megabyte that is added on to your machine.

Colour sequences will always consist of just five frames – the image you see, the three colour component images and the output image created from them.

The *Vidi* application opens a desktop window which allows the brightness of the image to be manipulated from software, as shown in the shot above, either odd or even interlaced frames to be grabbed and single colour component frames to be grabbed. Brightness can also be altered using the hard-

ware controls on the card's back panel.

Grabbed frames can be saved to disk or exported to other Archimedes packages as sprites, or to other computers as Tiff files. The correct palette to show the image as it is intended, can be chosen from a number supplied (giving images with an overall tint or a grey scale) or edited to your own requirements. This palette is then saved with the image.

Monochrome images use only a 16-level greyscale with a resolution of 320x256 – too small for real quality. Much better is the colour grabbing with 640x256 in 256 colours. Colour images can be viewed in their red, green and blue component form or as the complete image. Indeed, you can regrab individual components to 'touch up' a picture.

The other two digitiser applications provided take over the Archimedes and provide simple monochrome sequence and colour image grabbing. Both of these operate much like a video recorder with a record button to grab the sequence and forward and reverse buttons to view the next or last frame in a sequence.

There's also a brightness

control, a magnifying function and you can select one frame of a sequence or one component of a colour image. The *Vidi* package provides a complete range of control for the Vidi hardware, from the complex *Vidi* application program right down to the SWI calls that you can use for writing your own software (the *BVidi* and *Colour* applications are, in fact, only Basic programs themselves).

With the motivation, there is not much that the Vidi card cannot do, but the results are not always as wonderful as the examples given on the disks. This can usually be put down to the lighting of a live subject – which is always difficult to get just right – or just the basic quality limitations of video recordings.

Monochrome grabbed images are slightly disappointing but, with a good video signal, the Vidi digitiser provides an excellent source of quick, high quality and, above all, fun colour graphics for any Archimedes user.

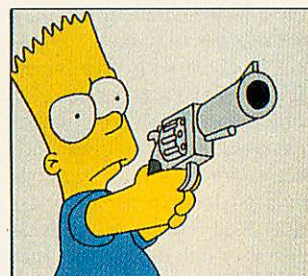
VISION £49

Vision is both a simple product and a remarkably cheap one. Using this card, it is quite possible, with a bit of hunting

around, to put together a complete camera and digitiser package for about £100.

The Vision card is a half-width module and it doesn't have a lot on it – but apparently there's enough. This digitiser only works in mono and a single phono socket on the back panel lets in the composite video signal.

The software supplied with the Vision card is simple, too,



Vision can produce a colour picture. Simply trace around the original sprite using Draw, then add your own colour to the image

with the bare minimum supplied on one disk. One application, *Vision*, is all that is provided, apart for the manual supplied on disk as well.

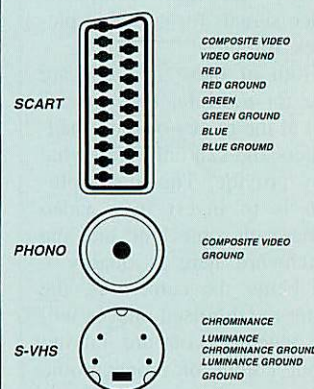
The application produces a desktop window showing the video signal, continually grabbed at a rate of about once a second. The image is grabbed by selection from a menu and

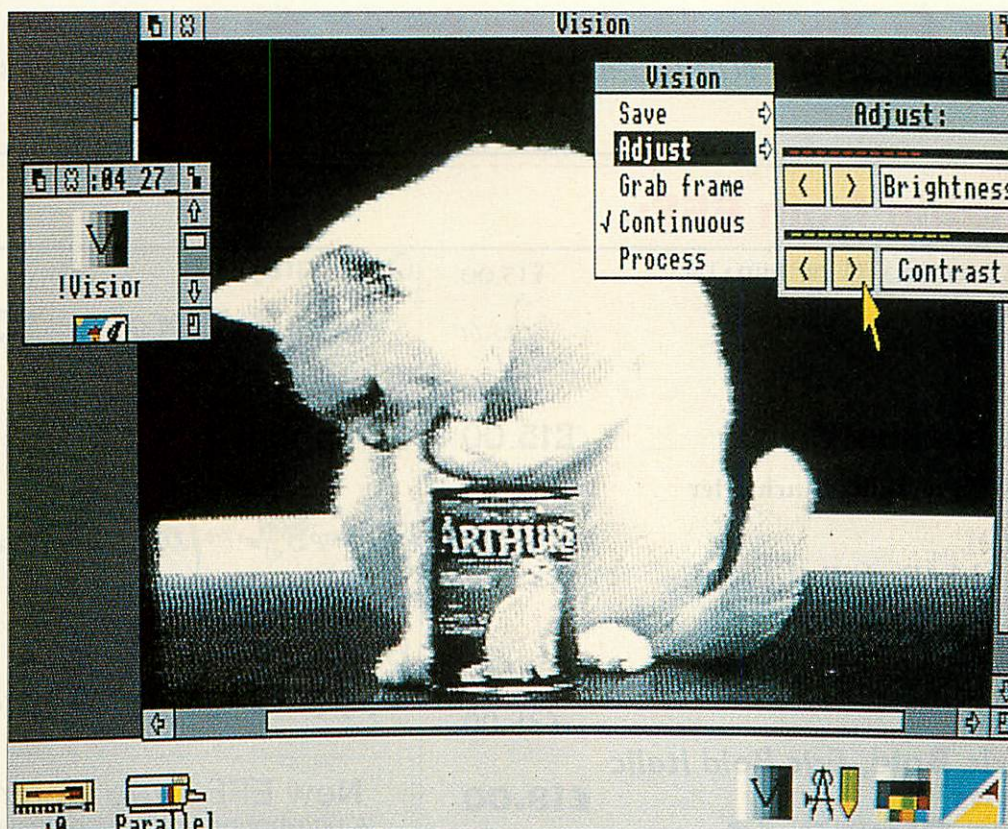
CONNECTIONS

The different video signals are to be found on different equipment in different sockets. Composite video signals are available from video recorders, camcorders and closed-circuit TV cameras, either on phono sockets or Scart sockets. Scart sockets also provide video in connections and stereo audio connections (both in and out) but these do not concern their connection to video digitisers.

The S-VHS signals of chrominance and luminance are found on certain top end TVs, S-VHS video recorders and S-VHS or Hi-8 camcorders. The S-VHS sockets is standard across all this equipment. Digitisers usually have either phono or BNC sockets to input composite video or an S-VHS terminal for these signals. Leads to connect your equipment to the digitiser are easily made up according to the pinouts of the common output sockets given.

A few digitisers can also take RGB signals. These are found on a few items of specialised equipment (certain MAC satellite receivers, for example) either as separate sockets for each component (often phono or BNC sockets) or on special sockets such as the monitor socket found on the Archimedes or on the standard Scart socket.





Vision comes with one software package that does everything

VIDEO SIGNALS

There are many sorts of video signal which any video equipment, including a digitiser, might have to cope with. These are best considered in the order that they are met, as they arrive 'off air' on their way to your TV screen.

Picked up by your TV aerial (and indeed by a satellite dish) is a modulated PAL signal. This contains all the picture and sound information on a carrier frequency which you tune your TV (or satellite receiver) to. This signal is not suitable for digitisers.

Your TV demodulates this to give a composite PAL video signal. This contains all the picture information and is the same kind of signal that most mono computer monitors use, except the TV picture is, of course, in colour.

Next, the TV separates this into its separate components of picture brightness (luminance) and colour (chrominance). This signal combination is of the type used by S-VHS camcorders and S-terminal TVs.

Lastly, these signals are combined and separated to give the three signals directly controlling the red, green and blue 'guns' in your TV. Such RGB signals are used in most high-resolution computer displays (including the Archimedes).

It is these last separated components which are stored in the Arc's Ram when a picture is digitised. The further down this chain you produce, store or sample the signals, the better the quality of the image as less processing is performed on it.

this operation is itself rather unpredictable. Because of the amount of time that the computer spends attending to the image, the task involved in getting the right image is rather tricky – by the time you see the scene that you want on screen, and the software has responded to the mouse, the moment has gone.

Brightness and contrast are controlled from software with

the same menu and the continuous image is displayed in a low resolution form – for speed! When grabbed, this is converted to a higher quality 640x250, 256-greyscale sprite and it must be said that the results are pretty impressive. Even from standard VHS videos, useful images are simple to grab.

One problem is that the Vision card misses off a small

portion of the top of the 'broadcast' picture. However, this rarely really matters to the final image. The final sprite can then be saved to disk in the normal way and exported to applications for art, DTP or whatever. The attraction of Vision is its simplicity. This is also part of its downfall. There is no information on how to use the podule in your own programs, or in any other way than the straightforward application that's supplied.

However, HCCS does promise a module to enable users to operate the podule with *commands and SWts. This will be available at a nominal extra cost. Also promised soon is a colour upgrade for this monochrome board.

Even in this simple form, the Vision board has a lot to recommend it. The quality of images produced is good – not of photographic standard but that's largely down to the constraints of the video source. This is about as good as you're likely to get on the Archimedes. What's more, there is no denying the cheapness of this product.

For this money you can afford to take a gamble – especially when the odds are so heavily in your favour.

WHAT CAMERA?

Using your own video camera is one way to guarantee control over the images that you use, regardless of the type of digitiser. In fact many Archimedes owners will already have a reasonably high quality video camera – a domestic camcorder can produce the right signals for connection to a digitiser. Recorded or live shots can then be fed from the camcorder to the digitiser in the same way as those from a video recorder.

If you don't have a camcorder, monochrome closed-circuit TV cameras can be bought quite cheaply. These are usually used for watching the front door from a back room, and the like.

Look through the ads in hobby electronics magazines, such as *Electronics Today International*. Secondhand and surplus stock surveillance cameras from the likes of Bull Electrical and RTVC can also make good video sources for Archimedes digitisers and these can typically cost around £80 a time.

For this review, a NV-S7B S-VHS camcorder was used along with a secondhand surveillance camera (picked up for £55) and an assortment of domestic VHS VCRs and satellite TV receivers.

Whatever the video source – off air TV, satellite, tapes or camera – a video digitiser opens up a whole new world of graphical input for the Archimedes.

PRODUCT DETAILS

Product: Vision
Supplier: HCCS
Address: 575-583 Durham Road, Engine Lane, Low Fell, Gateshead, Tyne and Wear NE9 5JJ
Tel: 091-487 0760
Price: £49 (£59 for A3000 external podule)
Machines: All Archimedes, BBC A3000

Product: Vidi-Archimedes
Supplier: Rombo
Address: Baird Road, Livingston, Scotland EH54 7AZ
Tel: (0506) 466601
Price: £149
Machines: All Archimedes, BBC A3000

The Electronic Font Foundry



Purveyors of High Quality Fonts for Archimedes computers,

New Fonts available from EFF:

aidan	similar to omnia™ OR LIBRA™	£15.00
<i>Allegro</i>	<i>Shelley Allegro Script™</i>	£35.00
<i>Andante</i>	<i>Shelley Andante Script™</i>	£35.00
Arnold	Arnold Boeklin™	£15.00
<i>Ascot Black</i>	<i>Linotext™</i> , a light Blackletter	£18.00
Bob	Melior™	£35.00
Bob, Bob Italic, Bob Bold, Bob Bold Italic		
Digital	Similar to LCD™ or LED™	
<i>Digital Digital Oblique</i>		£16.00
Eric 1	Gill Sans™	£35.00
Eric Regular, Eric Italic, Eric Bold, Eric Bold Italic		
Eric 2	Gill Sans™	£18.00
Eric ExtraBold, Eric UltraBold		
Eric 3	Gill Sans™	£25.00
Narrow, Bold Narrow, UltraBold Narrow		
<i>Eve Open,</i>	(Caslon Open Face™)	£35.00
<i>Fortuna</i>	<i>Tekton™</i>	£25.00
<i>Fortuna Regular, Fortuna Oblique.</i>		
Gruby	Blippo Black™	£25.00
Gruby Black. Gruby Black Italic		
LIPA	JUNIPER™	£12.00
<i>LondonA 1</i>	<i>Adobe Garamond™</i>	£40.00
<i>Regular, Italic, Bold, Bold Italic</i>		
<i>LondonA 2</i>	<i>Adobe Garamond</i>	£25.00
<i>Demi Bold, Demi Bold Italic</i>		
<i>Pisa 1</i>	<i>Eras™</i>	£25.00
<i>Book, Demi Bold</i>		
<i>Pisa 2</i>	<i>Eras™</i>	£35.00
<i>Light, Medium, Ultra Bold</i>		
<i>Rosemary</i>	<i>Korinna™</i>	£40.00
<i>Regular, Italic, Extra Bold, Extra Bold Italic,</i>		
SHERIFF	COTTONWOOD™	£15.00
<i>Veronica</i>	<i>Sabon™</i>	£40.00
<i>Veronica, Veronica Italic, Veronica Bold, Bold Italic</i>		
<i>Venice</i>	<i>Italian Old Style™</i>	£40.00
<i>Venice, Venice Italic, Venice Bold, Venice Bold Italic</i>		

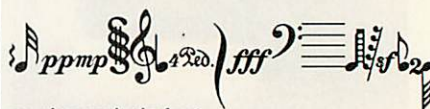
Font names are © EFF, Adobe, Bitstream and Monotype where appropriate

Cartograph £25.00



map symbols font

Symphony £25.00



music symbols font

Braille £6.00



New EFF Type Library

A ring-bound volume containing printed examples of all of our range of fonts. Price includes 1 year's subscription to new pages as new fonts are released. £24.95

We have the largest range of fonts available for the Archimedes, all properly hinted and well made by professionals. All of our near 300 fonts are available in all the Latin alphabets.

We have 50 foreign fonts, including: Greek, Vietnamese, Russian, Hebrew, Bengali, Tamil, Punjabi, Gujarati and Devanagiri.

We sell DTP related hardware and software and provide a complete telephone help service to any of our customers who need it.

For a free catalogue and pricelist, with details of our Fonts, Hardware and Software, please call or write.

For all orders please add:
£2.50 p & p and 17½% VAT.



Telephone orders accepted

The **Electronic Font Foundry**

50-52, Upper Village Road
Ascot, Berkshire, SL5 7AQ

Telephone: 0344 28698

Facsimile: 0344 872923

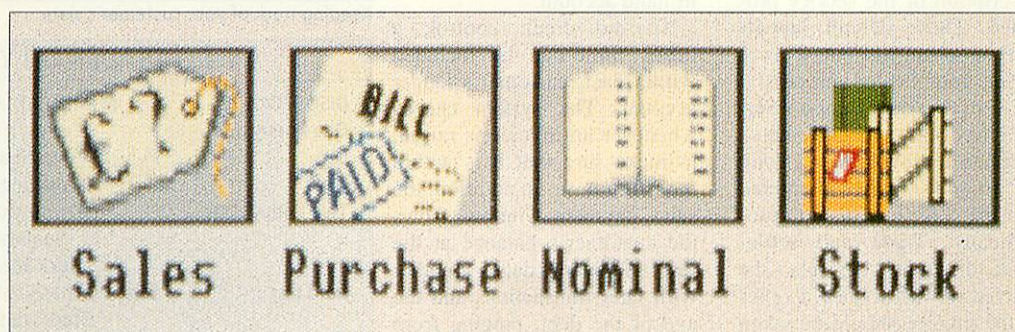
All prices are ex-delivery & VAT,
and are subject to change.

New business packages are a rare event in the Acorn world and so it was refreshing to hear that Pres was launching a new-comer in this field. However, *Micro Trader* is not a completely fresh face, but rather an suite of programs based on Pres' original packages. Now it has been adapted to take full advantage of Risc OS.

Micro Trader is made up of four modules: Sales Ledger, Purchase Ledger, Nominal Ledger and Stock Control. Also on the way are two additional modules called Mailer, available in the near future, and Payroll, which is still under development.

Each module can be used as a stand-alone application or with the other modules. If used collectively, the modules are fully integrated so when an entry is made in one module, *Micro Trader* will fill in the appropriate entries in another module, in keeping with the double entry book-keeping system. In addition, if the entire system is used, then full VAT accounting is available and the Nominal Ledger module provides the facility for the production of a Trial Balance, a profit & loss account and a balance sheet.

TRADING PLACES



Sales, purchase and nominal ledgers, plus stock control, all come into the domain of Micro Trader. Roy Smith audits the latest all-in business solution for the Archimedes

MULTI-TASKING

The modules take full advantage of the Risc OS multi-tasking facilities and it is possible to have many windows open simultaneously on the screen and move from one operation to another. All four modules fit onto one floppy disc and so the system will operate without disc-swapping. Pres claims that it will multi-task on any Archimedes, including the A3000, and only 1Mb of Ram is needed.

In modes 12, 15 and 20, some of the windows are almost as large as the screen. Although you can use the conventional back icon, you cannot actually adjust the window size. For multi-tasking, windows have to be dragged off the screen. However multiwindows are possible in mode 102, or something similar.

All printing is done through the Risc OS printer drivers and the various accounts and docu-

ments can be viewed using *Edit* or a DTP application.

When you Select the MicroTrader icon, the control panel will appear, providing access to all the different modules. The working date is the current date by default, but by clicking on the Working Date box a dialogue appears enabling the date to be changed. The same batch number is allocated to each transaction in one session – a session being defined as every time the computer is switched on or the working date is changed. It is useful for locating small groups of items and for cross-referencing.

The Final box is used for the end of year procedures and the Maintain box allows you to change the VAT rate, details of the person using the system and security information.

By clicking on the appropriate icon, such as Sales Ledger, and then extending the arrow on the Transactions option, a

further dialogue box appears offering several choices. A click on the appropriate item will then throw up a window and the function can be performed – such as preparing and printing an invoice or credit note, recording a cash sale, entering a payment, preparing and printing a statement or making an adjustment. A similar approach is used throughout, making the whole system almost entirely menu-driven.

BUSINESS USERS

If a user merely needs to prepare invoices and statements, it could be possible to use the Sales Ledger in isolation. However, to make use of the double entry system, the Nominal Ledger is needed. This can provide a record of cash received, enabling a cash-up procedure and an analysis of sales. However, many small to medium businesses will require the additional benefits

Sales Account				
1003	Browse	Find	Account details:-	
R.J. Smith & Co. Long Lane Westbury Avon BS20 8RR		Statement period start: 1		
		Settlement Disc: 0 %		
		Settlement Period: 30 days		
Total balance:	569.51	Credit Limit:	2,000.00	
3 Months:-	2 Months:-	1 Month:-	Cur. Month:-	
569.51	0.00	0.00	0.00	
Cancel Update New Acc Delete Print OK				

Inside the sales ledger

provided by the whole four-module system.

Although there are too many functions to describe each module in detail, the general philosophy of the system can be shown using the Sales Ledger, assuming that the other four modules are in use.

INSIDE THE MODULE

Two default formats are available for sales invoices: one is designed for businesses that sell items from stock and wish to use the Stock Control facility, while the other is aimed at those that need to include a description of the service provided. These default layouts can be changed, but it is a rather complicated process – the Pres Product Support Service may offer assistance here.

When an invoice is set out, the account number is entered and the VAT calculated automatically. Trade and settlement discounts can also be entered on the invoice. Copies of the invoice should be taken and stored for later reference.

So how does this relate to Stock Control? Well, by entering the stock number on the invoice, complete details of the item, including the VAT code, are located in the Stock Control. These details are then put into the invoice and recorded in Stock Control.

The double-entry of the transaction is achieved by the next stage. If you enter the Nominal Account income account number – having charged the customer the net total of the invoice – the income account is credited and the Sales Ledger Control accordingly debited.

Credit notes are produced in a similar way; the only difference, naturally enough, is that the double-entry automatic postings to the Stock Control and the Nominal Ledger are reversed. Like sales invoices, copies of the credit notes must be retained and filed.

As far as cash sales are concerned, no invoice is needed, so the cash is posted to the appropriate income account in the Nominal Ledger and recorded on the Stock Control. However, if the Nominal Ledger is not installed, no record of the cash sale is kept – this can be overcome by raising an invoice, with the transaction recorded in the Sales Ledger in a special cash sales account. Any cash that is received is credited to the customer and then posted to the Sales Ledger control, where it is added to the cash-in-hand account.

To aid credit control, a credit limit can be included within each customer's ledger account. The system checks whenever an invoice is raised, to make sure that it is within the given limit. In addition, the sales payment window shows the customer's balance at the last statement date, together with later transactions and the age of the debt, ranging from one to three months.

No date information appears in the Sales Payment window (or, for that matter, the purchases payment window). The entries are made with the default date which, if not adjusted, is the date on which the entry is made. If another date is required, the working date option on the control panel has to be changed. All other working windows show the date, with the option available to change this before making the entry.

Statements should be printed on a regular basis, at the period end. You have the choice of sending them to individual customers or to all customers with an outstanding balance. The period that the statement covers is defined whenever you set up a new customer account.

An important part of the program is a facility to make corrections but there are only

Credit Sale Invoice					
Account:	<input type="text" value="1003"/>	<input type="button" value="Browse"/>	<input type="button" value="Find"/>		
Name:	R.J. Smith & Co. Long Lane Westbury Avon BS20 8RR				
Nominal:	<input type="text" value="149"/>	<input type="button" value="Browse"/>	<input type="button" value="Find"/>		
Name:	ACCOUNT SALES				
	Invoice No:	<input type="text" value="337"/>			
	Customer's Order No:	<input type="text"/>			
	Invoice Date:	<input type="text" value="13.03.92"/>			
It Code	Description	Qty	Value	Dis Net Amount	V
Discounts:- Trade:		<input type="text" value="0"/>	% <input type="text" value="0.00"/>	Settlement:	<input type="text" value="0"/> % <input type="text" value="0.00"/>
Totals:- Goods:		<input type="text" value="0.00"/>	Vat:	<input type="text" value="0.00"/>	Invoice: <input type="text" value="0.00"/>
<input type="button" value="Cancel"/>		<input type="checkbox"/> Cash received		<input type="button" value="OK"/>	

Keeping track of your customer's slate

MICRO TRADER ON YOUR MACHINE

DISC STORAGE	NUMBER OF ACCOUNTS
One floppy disc	Sales/purchase 700, Nominal 250 Stock lines 1,000
Two floppy discs	Sales/purchase 1,500 Nominal 250 Stock lines 4,000
Hard disc	Sales/Purchase/nominal unlimited Stock lines 99,999

Micro trader can cope with an annual turnover of £21 million, 9,999 transactions per month, and offers ten variable VAT rates

eight characters supplied for recording the reason for the correction. One way around this that is suggested by Pres, is to enter an opposite transaction to cancel out the incorrect one. You can then re-enter a correct version.

REPORTS

This type of application needs to be capable of providing reports at the drop of a hat and, *Micro Trader* duly complies, by offering a selection of reports: details of all of the accounts, audit trails, account reports giving all transactions for a specified customer, aged debtors – which gives all Sales Ledger Accounts showing break down in periods of age and ‘good’ debts – and finally, all customer statements.

Once every calendar month, the period end routine must be run after a routine back-up. A printer is essential for this operation. It prints out an audit trail of all stored transactions, then a listing of all accounts showing opening and closing of balances and transactions for each account. This listing is very important and should be kept on file and stored

safely as it is an essential record for commercial, legal and audit purposes.

The reason I have stressed the need for both a back-up and a hard copy, is down to the nature of the Period End routine. Transactions relating to the current month are retained on disc, whereas all other transactions are deleted. So any enquiries about the deleted period will need to be referred back to the hard listing.

The Purchase Ledger details of purchases of goods or services for resale or use in the business and expenses that are paid for against an invoice (on credit). Expenses paid for in cash are normally posted direct to the appropriate account in the Nominal Ledger.

The Purchase Ledger, like the Sales Ledger, interacts automatically with the Stock Control and the Nominal Ledger. A purchase invoice can be allocated to any stock or expense account (including acquisitions of assets) and then sub-divided into departments or categories.

However, only whole invoices can be allocated, not part invoices so, if you need an

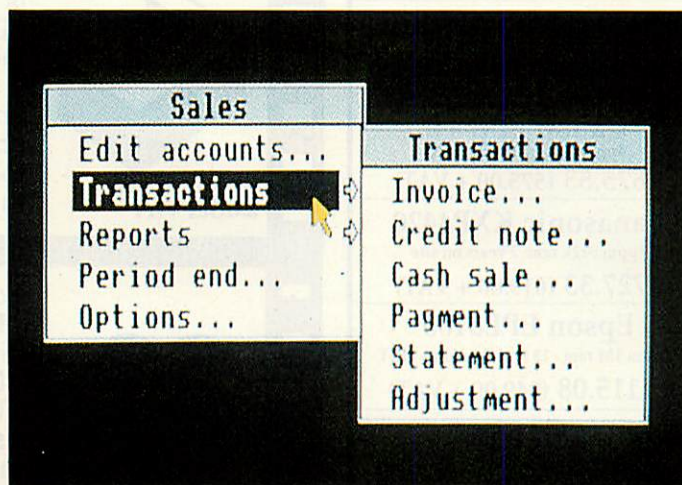
CHOOSING YOUR MODULES

The average home user will not need to keep individual accounts for debtors or creditors – or at least one would hope not! In this case, the accounts can be kept using just the Nominal Ledger. This will keep track of cash and banking details, analyse income into the sources and expenditure into whatever categories are preferred.

Depending on their products, cash retailers may not need the Sales Ledger or Stock Control module, whereas many other small to medium business users will be best off with the whole system.

analysis, a separate dummy invoice is made for each department or expense item.

Normally the supplier's own statement will be available, but the system must also produce internal statements in order to comply with the period end routine. As with the other period end routines, the details that are removed from disc will be available in the period end listings, (and on your back-up disc) for future reference. Remittance advice can be printed to accompany payments and VAT, and trade and settlement discounts are accounted for.



Keeping track of all transactions is the key to good accounting

STOCK CONTROL

Each item of stock can be identified by a reference name or number of up to eight characters. The stock record for each item contains the following: a 24-character description: a department code, a product-type code, a supplier's purchase ledger account number, re-order level, VAT code, the current cost price, the average cost price per item, the selling price, the quantity in stock and finally the turnover. There are many useful reports available, as shown in our screen shot of the stock menus derived from the control panel. The period end routine for stock control is, once again, performed monthly.

NOMINAL LEDGER

This ledger is at the heart of the system and holds the complete account records of the business. The accounts are divided into the usual four groups – income, expenditure, assets and liabilities, and each group has up to 100 separate

accounts available. Some of these accounts are pre-defined (known as fixed accounts) and the user can add further accounts to meet their own requirements.

The original set-up of this ledger is the most important part of running the program and also the most difficult. We strongly recommend that an accountant is sought out at this initial stage as the results will, at a later stage, be falling into the hands of the dreaded Inland Revenue!

The all important bank accounts are dealt with in this ledger. All monies received (cheques or cash) are initially posted to the cash-in-hand account and then, when the banking takes place, this amount is transferred to the bank as a separate transaction.

One part of this module that is particularly suitable for retail businesses, is the cash-up facility. It allows for cash received, deductions for cash expenses and any banking of the balance to be recorded in a single process.

The VAT control account is also in this ledger and the routine takes place from the beginning of the current VAT quarter. Pres actually offers an assurance that the system has been examined by a Customs & Excise Inspector, who passed it as suitable for VAT accounting requirements and for Retail Schemes A and F.

Menu facilities for the inclusion of accruals and prepayments are provided at the beginning and end of each period. Depreciation can be calculated and entered on a monthly basis, and interim

profit & loss accounts can be produced at any time, for example once a month, to show the progress of business. Departmental accounts can also be produced.

Once again, the period end routine must take place monthly. The audit trail is printed, followed by a list of all transactions, and finally all the previous month's transactions are deleted from the disc and the balances are brought forward. It is essential that these printed listings are carefully filed.

The final accounts, profit & loss account and balance sheet, are produced by choosing the Final icon on the control panel.

FEELING SECURE

After installation, the user's name is entered, which triggers a prompt for a security code. This can be obtained from suppliers over the telephone and the system manual will be sent to each registered user. A further final accounts code is also supplied to give restricted use to the final accounts section in the Nominal Ledger module.

The program will run without the security code but only for ten sessions before it freezes! This means, of course, that the system can only be used by one registered user. If the user has more than one business or is a professional accountant wishing to put more than one client on the system, he can apply to the suppliers for additional security codes which are available at £80 each.

This package was obviously designed by someone with

experience at the sharp end of book-keeping and accounting for the small to medium business. Providing it is used according to the carefully laid-down instructions, it will do the task that it is designed for very efficiently.

The system manual is excellent – for instance, a data disc logging sheet outlines the routine for disc backup mentioned above. It is both comprehensive and easy to follow and is supplied in a strong ring binder. Also supplied is a green card which provides a useful quick guide to entry procedures for the more common transactions.

There are a couple of minor bugs, relating to the annual turnover report and the fact that the audit trail batch report displays the current batch number only. However, alternative solutions to this are offered in the note with the current version.

One bonus is that a product support scheme is available free for the first month to help you to find your feet. A free demo disc is on offer direct from Pres. The advice must be: if you are a potential business user, obtain a copy and discuss with your accountant whether it will fulfil all the requirements of your particular business – the system is constructed in such a way that it should be easily adaptable.

Like all accounting systems of this size, transactions need to be regularly deleted from the disc. This involves an end of period routine, when the discs are backed up and also a hard copy of transactions is filed. Any adjustments made by the user should be given adequate references in the eight-digit box provided, and explanatory notes then filed as part of the permanent accounting records.

THE PC COMPARISON

Comparing Micro Trader with available accounting programs of its size, and consequent limitations, most of which are only available for PCs, it comes most favourably out of the comparison both in terms of performance and price.

It is powerful, flexible and certainly a pleasure to use. There is the added benefit that the Arc's desktop windows are in a different league to the much-publicised Windows on PC systems!

PRODUCT DETAILS

Supplier: Pres Ltd
Address: PO Box 319, Lightwater, Surrey GU18 5PW
Tel: (0276) 72046
Prices: Complete system (sales, purchase, nominal ledgers and stock control) £279.00, modules £79.95 each, Mailer £49.95, Payroll price not yet fixed.
All prices exclude VAT

WeServe of Hampshire Educational Specialist

Visit our showrooms. See before you buy.

Taxan 795

Multivision with VIDC
£468.83 (£399.00 + VAT)

Swift 24E

Enhanced 24 pin. Colour printer
2 year warranty. + cable & paper
£269.00 (228.94 + VAT)

Arm 3

25 mHt for A400 etc.
£210.00 (178.72 + VAT)

Philips CM8833 Mk2

Colour Monitor with cable
£219.00 (£186.38 + VAT)

Taxan 775

Multisync Monitor with cable
£433.58 (369.00 + VAT)

PRINTER RIBBONS

	ex VAT	Inc VAT
LX800 & FX800 Print Ribbon.....	2.29	2.69
LC10 Print Ribbon.....	4.00	4.70
120D Print Ribbon.....	4.00	4.70
Taxan/Canon Ribbon.....	3.22	3.78
Juki 6100 Print Ribbon.....	1.60	1.88

Phone for full range 100 + original &
Compatible ribbons - Bulk discounts

8271
disk controller chip
£38.26 + VAT

UPGRADES/8271

	ex VAT	Inc VAT
27128A 250ns 12.5v.....	3.00	3.52
8271 controller.....	38.26	44.95
6264 LP 150ns.....	3.00	3.53
Acorn 8271 DFS.....	44.26	52.00
Acorn 1770 DFS.....	45.11	53.00
A3 Concept Keyboard.....	139.00	163.32
Master Keyboard.....	50.21	59.00
Acorn Tracker Ball.....	38.30	45.00

NEW A3000

Learning Curve
+Printer +Monitor & Stand
£999.00 inc VAT

A5000 + LC + Printer + Monitor
£1765.00 (£1502.13 + VAT)

A3000 + 2m RAM
£658.00 (£560.00 + VAT)

A3000 LC + 2m RAM
£740.25 (£630 + VAT)

Phone for our 60 Page Catalogue
EDUCATIONAL & GOVERNMENT ORDERS WELCOME

All products have a 30 day money back & 12 month warranty
Prices subject to variation without prior notification
Established 6 years. 3 minutes from M27 Junction 11.
Free parking. Open 9 to 5.30 Mon. to Friday. 9 to 5 on Saturday
Postage 94p (80p + VAT) Securicor £6.46 (5.50 + VAT)

WeServe



Larger items
delivered
by Securicor



Acorn Dept.
40-42 West Street,
Portchester
Hants
PO16 9UW
Tel: 0705 325354

Laser Printers

Canon LPB 4+
4ppm 512k ram with AIR
£675.53 (575.00 + VAT)

Panasonic KXP4420
8ppm 512k ram 2 years on site
£727.33 (619.00 + VAT)

Epson EPL8100
10ppm 1M ram 13 Scalable fonts RIT
£1115.08 (949.00 + VAT)

Star

LC20 9 pin	£129.00
LC200 9 pin col.	£189.00
LC2420 24 pin	£195.00
LC24200 24 pin	£219.40
LC24200 Colour	£269.00

prices include cable, paper & VAT

Citizen 120D+

with cable and paper
£119.00 (£101.28 + VAT)

ROMS/SOFTWARE

	ex VAT	Inc VAT
Inter-word Rom.....	35.75	42.00
Spell Master Rom.....	40.00	47.00
View 3 Rom.....	40.00	47.00
DTP-Acorn.....	120.00	141.00
Impressions 2.....	134.47	158.00

Phone for BBC/AS catalogue 100's
100's of titles inc. Educational

A3000 TV Modulator
£39.90 (£33.19 + VAT)

HCCS Hard Card 45
£399.00 (£339.57 + VAT)

Sony DISKETTES

SONY branded
(100% certified error free)

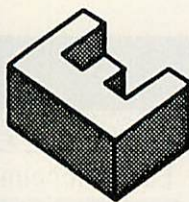
	Inc VAT
10 3.5" DS/DD 135 tpi	£7.50
50 3.5" DS/DD 135 tpi	£32.31
100 3.5" DS/DD 135 tpi	£59.93
1k 3.5" DS/DD 135 tpi	£540.50

DISKETTES

(lifetime warranty) SONY bulk
(100% certified error free)

	Inc VAT
10 3.5" DS/DD 135 tpi	£5.95
50 3.5" DS/DD 135 tpi	£21.86
100 3.5" DS/DD 135 tpi	£39.60
250 3.5" DS/DD 135 tpi	£94.88
1k 3.5" DS/DD 135 tpi	£353.68
40 x 3.5" Disk Box with lock	£5.49
100 x 3.5" Disk Box with lock	£7.50

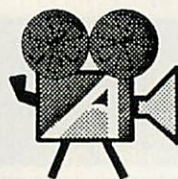
Carriage on 50+ disks £3.53



£68ex VAT

Euclid

is the most widely used
3D graphics system for
the Archimedes.
It allows you to design
and model any set of
objects quickly using
tools which are similar to
those used in Draw.



£24ex VAT

control by Mogul

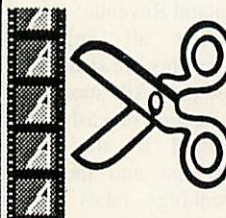
gives the most widely used
3D animation system.
Films can be planned
using a spreadsheet
indicating just the key
positions of moving objects
including cameras.



£34ex VAT

accompanied by Tween

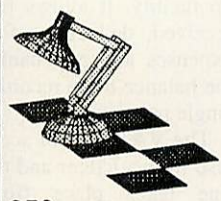
the way to produce films
from Draw files.
Files can be imported from
any package which can
produce a draw file for
example graph drawing or
font bending packages.



£34ex VAT

edited by Splice

the ideal way to convert
sprites into films or join
films together.
All Ace products allow
import and export of either
Sprites, Drawfiles or Ace
films (the leading standard)



£50ex VAT

illumination by ArcLight

which can add realistic
shadows and reflections to
Euclid files and Mogul films
All Ace products multitask
comfortably so that long
processes like Ray-tracing
occur in the background.



available now from
Ace Computing
who also publish a host of
RISC OS printer drivers.

For further information please write to:
Ace Computing, 27 Victoria Road,
Cambridge, CB4 3BW
Tel:(0223) 322559 Fax:(0223) 69180
Site licences available. Visa/Access accepted.



One of the most practical applications that Clares has published to date has to be *Titler*. Although it is primarily aimed at the video enthusiast, who can use *Titler* to add text and graphics to standard videos, *Titler* can also be used on its own to produce impressive demonstrations complete with graphics and music. To use the software as a video tool, you must have a suitable genlock board fitted to your computer.

Titler comes supplied on two disks. The first disc, suitably named *Titler*, is used for creating screens that can contain both graphics and text. The second, called *Sequencer*, is used to link those screens and create a sequence of pictures and/or animations in just about any style that you like.

Upon loading the software, you are greeted by a small main menu containing six icons and a longer grey rectangle situated below. The icons denote File Information, Fonts, Text Formatting, Effects (FX), Colours and Tools.

THE SCRIPT

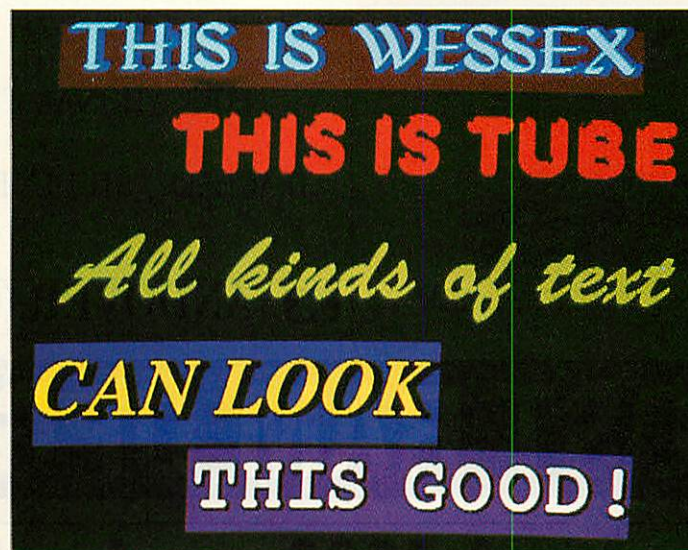
The grey rectangle acts as an entry box which, when clicked on, allows access to the Script editing screen. Entering text can begin immediately using the default font, size and colour. These options can be changed very easily, either by returning to the main menu or by making use of the keyboard shortcuts (a function keystrip is provided). The Script editing screen is initially black, but any of 11 other colours can be used instead.

Pictures created using art packages can also be used as backdrops for your text and can be imported from *Atelier*, *Pro Artisan*, *Render Bender* or as *Draw* files or sprite files. Finished work can be saved in these same formats or as a *Titler* script or format file.

Text is entered at the cursor position and can be moved around the screen until it is fixed by pressing the Select button. Blocks of text can be built up in this way and each block can be assigned a different font, colour or size before fixing. Kerning – reducing or increasing the space between letters – is a useful inclusion, and this really comes into its

WHAT'S IN A TITLE?

A new package for video users allows the Arc to make its own contribution to the small screen. Peter Clements investigates



Titler offers a wide range of fonts and effects

own when using large characters, as at this size the gaps appear wider than ever. *Titler* allows you to kern up and down as well, which is ideal if you want a rippled text effect.

Titler uses outline fonts and these can be fully anti-aliased even at very large sizes. This is because the emphasis here is on visual presentation rather than providing a standard desktop application such as DTP. Text can be fully justified, positioned left, right or centred and coloured in any one of 12 colours, three of which are user-defined. The intensity of each of the colours can also be changed and a useful touch here is the ability to alias the main text colour – which might be red at full intensity – to the outline colour, which can either be a darker red or a different colour altogether. A range of special effects are provided with *Titler*

and these include Drop Shadow, Underline, Rubout, Background and Slowprint. All of these can be active at once although you might not need them to be.

Drop shadows can make all the difference to a good looking block of text and can be offset and assigned any colour, again with the ability to increase or decrease the intensity. Underlines can also be coloured, the height changed or even the shape altered at the end of a line.

When in Rubout mode any text typed at the prompt appears on a chosen background colour or box, the height of which is not adjustable. This is useful if you want your text to really stand out over a video image.

Perhaps the most interesting option available from this menu is Slowprint. This feature allows blocks of text to be

displayed one letter at a time. It is therefore possible to create an effect where the letters appear to be typing themselves on to the screen.

Add some other possibilities, such as the delay between each letter or line, or a Flash routine which, if used carefully, can create the effect of text fading up to full intensity, and it soon becomes apparent what a sophisticated piece of software *Titler* is.

SEQUENCING

This becomes even more obvious when you transport your work into the Sequencer. Pictures and animations can be dragged into the Sequencer window and displayed on the screen in a variety of ways.

Initially, the window is empty but loading a screen reveals three columns. The first shows the 'in' effect – the way that the picture is displayed when the sequence is run – the second, the filename, and the third, the 'out' effect. Clicking on the In or Out effects boxes cycles through those that are available to the user, some of which can be very impressive indeed. The program can accept *Render Bender* and *Euclid* animations, allowing the user to set both the speed and the number of times that they are displayed.

Music can be added in the form of *SoundTracker* tunes or *Armadeus* samples, so there really are a wealth of options to be explored. Sequences complete with music can be saved to disc either as files to be loaded back into the software or as stand-alone applications.

CONCLUSION

Up until now there has been very little in the way of video-dedicated software available. Clares seems to have changed that. This software is packed full of useful and helpful features and is certainly going to dominate this particular area of the market for some time.

PRODUCT DETAILS

Product: *Titler*
Supplier: Clares Micro Supplies
Address: 98 Middlewich Road,
Northwich, Cheshire. CW9 7DA
Tel: (0606) 48511
Price: £127.62 plus VAT

Create your own

italics

Italic is an exciting new RISC-OS program, costing only £10. It takes a normal Outline Font and transforms it in any way you like. The output is a proper font (not a draw file) so, having changed it, you can use it in all your favourite programs. Now you only have to buy half as many fonts.

Shade is a useful tool for creating DrawFiles of graduated fills, smoothly flowing between colours of your choice (like the background), and costs £4.

Back is a compact wimp program. In 32k, it offers a menu of things to load, shows a picture, saves the screen and lets you cache directories with our innovative *let's not copy the Mac* technique, it's only £5.

Outline Fonts

They have never been such good value for money. We charge £2.50 or less for beautifully sculpted fonts. No tricks, just the best deal around. Now Copper has Light, Medium and Bold.

Call for our free catalogue.

Carriage on all orders: £2



Design Concept
30 South Oswald Road
Edinburgh EH9 2HG

Telephone 031 668 4518

FACT SYSTEMS (BARROW) LTD

UNIT 19, FOCUS 303 BUSINESS CENTRE, SOUTH WAY,
WALWORTH IND. EST., ANDOVER, HANTS. SP10 5NY.

Acorn
AUTHORISED DEALER

SOUTHERN SPECIALISTS

ALWAYS THE FULL RANGE
OF ACORN HARDWARE AND
SOFTWARE ON DEMONSTRATION
IN OUR SHOWROOM

EDUCATIONAL CLIENTS WELCOME

TEACHERS / STUDENTS SCHEME OPERATED



ANDOVER (0264) 334811



LOW COST RAM UPGRADES

A 5000 2 meg

- GIVES TOTAL 4 MEG RAM
- 4 LAYER BOARD
- SIMPLE PLUG IN DESIGN
- FAST 70ns DIP RAM

Cheapest on the market!
We will match any quote!

£95 inc. P&P

A 3000 RAM

- 1 MEG - LOW COST **£36**
- 1 MEG - UPGRADEABLE **£44**
- 4 MEG **£132**
- BARE BOARD **£23**
- ALL PLUG IN DIY FITTING

*Prices exclude VAT, but include carriage charges
(UK mainland), packaging and insurance.*

A 310 RAM

- 4 MEG PLUG IN DIY FITTING
- HIGH QUALITY, GOLD PLATED CONNECTORS
- SEE OUR REVIEW IN "ACORN USER APRIL '92"

Cheapest plug-in design!

£243 inc. P&P

FITTED WITH
ARM 3 @ **£420**
(STILL JUST PLUGS IN)

DEALER
ENQUIRIES
WELCOME



GROUND CONTROL
ELECTRONICS LIMITED



UNIT 7, KINGFISHER COURT, HAMBRIDGE ROAD, NEWBURY, BERKSHIRE RG14 5SJ. TEL: 0635 524008 or 0622 747416 FAX: 0635 528115

As every teacher knows, data handling plays a leading role in the National Curriculum. Not only is it one of the five strands of IT, but data handling can also make a valuable contribution to many other subject areas, such as geography or history. As a result, it is very important for primary schools to choose the right data handling software and so the search for the definitive database continues.

Based on the popular *Pinpoint*, the new *Junior Pinpoint* hopes to lay claim to this title. The new version shares many features with its older cousin, but it has been simplified in certain areas in order to suit the needs of key stage 2 children. As well as being aimed directly at this age group, *Junior Pinpoint* can be configured to suit the age and abilities of a particular group of children, and additionally the editor and analysis tools can be deselected.

Like *Desktop Folio* by ESM, *Junior Pinpoint* allows you to design your own questionnaire forms to collate the data. Gone are the trials of setting up a template record card and in comes a simple form, limited to one page, with designated areas to enter answers. *Junior Pinpoint* offers whole screen or A4 sizes of stationary. Various types of answer are allowed for, such as plain text; a whole or decimal number; yes/no; dates and multiple choice.

USING THE TOOLS

Several tools are used to lay-out the form. A pen allows the user to enter text in any outline font in any size and there is a tool to draw borders in differing thicknesses with a variety of corners. In the same way as *Draw*, objects or sprites can be added and positioned, altered and arranged.

To place questions on the page, a question tool is used and the type of answer is selected from a dialogue box. Question and answer boxes can be dragged and positioned at will. Once complete, the questionnaire can be filled in on screen. Alternatively, they can be printed out, as a traditional questionnaire and the data entered into the computer

THE YOUNG ONE

Junior Pinpoint is aimed at the primary school. But will it live up to the standards set by its older cousin?

Chris Drage puts it to the test

at a later date. Once the facts and figures are collated, they can be manipulated to your heart's content and all data analysis is performed from a spreadsheet view of the file. Fields can be selected, deselected, searched, sorted and so on. Statistics are limited to largest, smallest and average and graphs to frequency, percentage and culminations of these. Graph styles include pie, bar, line and scatter with optional 3D effects and grid lines.

By plotting one graph at A4, another can be plotted and placed beside it, still leaving space for a report. Although children will need some practice to get the best out of the analysis section, familiarity with Risc OS will help and some interesting presentations can be achieved.

There's no manual as such, just a guide book full of illustrated examples for children's use. Pages can be photocopied and worked through in sequence or individually, but children need to be reasonably fluent readers. The idea is excellent as it means that even reluctant teachers can enjoy the hands-on tutorial.

SUMMARY

Setting up the questionnaire, entering questions and their data type and data entry is very easy indeed. Analysis and presentation is more complex but as everything can be de-configured and only introduced when children are ready, few problems are likely to arise.

Although a number of systems are already available for the Archimedes – *Datasweet*, *Junior Database* and *Keynote* are all well known – none of these apply to as many strands of IT capability as *Junior Pinpoint*.

The result is a software tool well-suited to primary school use and one of the few data handling programs that is truly fun and rewarding to use. At £24.00 it's money well spent.

Data can be accumulated by filling in a graphical questionnaire on screen

WHY JUNIOR PINPOINT?

Although *Junior Pinpoint* is based on *Pinpoint* there are some significant differences between the two applications. The kind of statistical operations performed from the sheet view are limited and there is no analysis workbench, making it impossible to open more than one stack of data sheets at a time. Ordered choice questions cannot be created or read and standard deviation, mean and median are not available. It is also impossible to perform a sort within a sort.

However, the language and configure option of *Junior Pinpoint* make it better suited to young children. *Junior Pinpoint* is limited to 500 sets of responses per questionnaire whereas *Pinpoint* can handle much larger files, multiple sheet questionnaires and has no size restriction of A4 or whole screen.

Junior Pinpoint is aimed at primary children, demanding a level of understanding relevant to years 2-6. *Pinpoint*, however, addresses data handling requirements of the National Curriculum for mathematics, key stages 3-4. We reviewed *Pinpoint* in our December 91 issue.

PRODUCT DETAILS

Product: Junior Pinpoint
Supplier: Longman Logotron
Tel: (0223) 425558
Price: £24.00 for the stand alone application, £72.00 for a site licence

Colour THE DRIVING FORCE



The first full colour printer drivers available for the Archimedes.

The colour TurboDrivers in conjunction with the BJC800 inkjet printer are ideal for colour proofing work or for anyone wanting a small number of high quality colour prints.

Key features:

- ▶ 360 dpi inkjet
- ▶ A4 and A3 paper sizes
- ▶ Plain paper capability although for best results Canon inkjet paper is highly recommended. Printer supplied with 20 sheets of A4 sample inkjet paper.
- ▶ Four colour, cyan, magenta, yellow and black ink for full spectrum colour and high quality blacks.
- ▶ Individually replaceable ink cartridges.
- ▶ The first true 24-bit colour RISC OS printer drivers. (All existing printer drivers based on Acorn code are only 8-bit or 256 colours maximum.) The colour TurboDrivers can produce millions of colour shades on the BJC800 from programs such as Impression, !Draw and Artworks. Acorn sprites are currently limited to 256 colours.
- ▶ Disc spooling allows background operation once the page has been rendered. This means control is returned as soon as possible and that the computer is not occupied when printing multiple copies.
- ▶ FastText rendering for maximum speed text printing.
- ▶ Advanced under colour removal and grey component replacement for best quality colour reproduction.
- ▶ Print times for A4 colour page approx 4 minutes, 8 minutes for A3.

Compatible with all Archimedes models and operating systems. 4Mbyte RAM minimum recommended.

RRP for Colour TurboDrivers and printer lead for BJC800 £99.00 + VAT (£116.32)

RRP for Canon BJC800 printer and drivers £1895.00 + VAT (£2226.62)

ACCESS & VISA WELCOME

TURBO
DRIVERS

 Computer Concepts Ltd

Gaddesden Place Hemel Hempstead Herts HP2 6EX
Tel: 0442 63933 Fax: 0442 231632

HOMeward BOUND

Chris Drage looks at a range of educational programs for young children to use at home

Parents often agonise over their childrens' grasp of the three basic Rs, and the latest software from Triple R Education aims to put this to rights. The range covers the fundamental educational topics of spelling, arithmetic and currency manipulation and this software is firmly aimed at the home user.

There are four separate applications within this range: *Picture Book*, *Money Matters* and *Target Maths* are suites of CAL (computer-assisted learning) programs, whereas *Converta-Key* helps younger children to use the keyboard. Although we reviewed the Archimedes' version, the BBC B and Master 128 versions are very similar.

PICTURE BOOK

Picture Book consists of four programs aimed at helping young children to become familiar with computers. As children are taught lower case letters before upper case, they often find the Qwerty arrangement confusing.

Triple R Education has helped to overcome this handicap by including two plastic

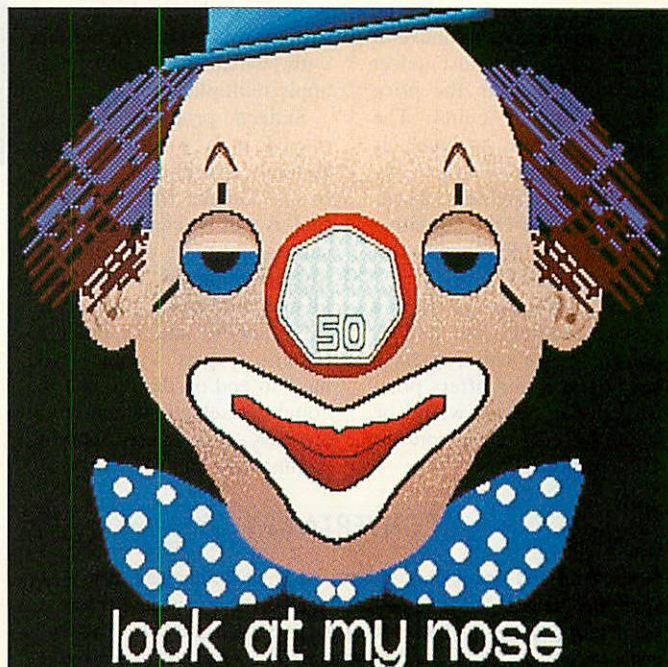
strips in the package, which can be applied to the computer keyboard to depict the lower case letters in either an alphabetical or Qwerty arrangement. An opening menu offers a choice of four programs: *Alphabet Book*, *Snap*, *Spell It* and *Count 'Em*.

FIRST THINGS FIRST

Alphabet Book is a computerised alphabet where letters are represented by objects. To capture the childrens' interest, simple animation is used; as a letter is pressed, the picture appears with its name and an accompanying sound. Of course, young children love the sounds, but some are repetitive, and there is a limit to the enjoyment a single banjo chord can provide.

I would prefer to see the use of a digitised voice reciting the word, so as to reinforce the links between sound, writing and pictures. After all, as teachers we are always trying to emphasise that reading is just speech written down.

The same pictures and sounds are then used in *Snap*, a matching game for up to three players. The pictures



Cozmo helps with basic coin recognition...

appear on the screen and to score a match the player presses the space bar. The first player to gain three points is the winner.

Although the repetition of the sounds is guaranteed to send parents potty, children actually love it. Remember though, competitive matching games are hard on the computer's keyboard as youngsters try to be the first to hit a key.

The final two programs also use the familiar pictures: *Count 'Em* is a counting exercise with three levels of difficulty. A random number of pictures appear on the screen up to a chosen limit of three, six or nine, and the child must enter the correct number from the numeric keys. *Spell It* requires the child to spell out the letters to match the caption for the picture on the screen – the overlay here is very useful. There are two levels, the second of which has no caption to help with spelling.

A pleasing aspect of *Picture Book* is the way that on-screen letters closely match those on the overlay strip, helping to reinforce letter-shape recognition. My four year old loved all the programs, especially the digitised applause for getting things right.

MONEY MATTERS

Learning about currency can be fun and this is obviously the aim of *Money Matters*. Based on a clown's theme, this application, like *Picture Book*, consists of four programs and uses a plastic keyboard overlay. However, this time the pictures on the strip are of coins and other symbols.

In *Cozmo's Coins*, Cozmo the clown helps children to recognise coins and discover their values. It's a program with three levels in which the third is timed. The next clown in the line-up is *Boingy*, named after his sprung nose. He chooses a few coins which add



... Boingy is the expert at working out the tips in restaurants...

up in value to one particular coin and the children must select the correct coin from the set displayed.

Children can earn money in *Fizzy Pop*, by helping Fizzy the clown to add amounts and give the right change. To add variety, the highest value and the number of coins in the change can be pre-selected.

Piggy Bank is a similar program, in which Toothy the clown thinks of a price and states the number of coins he expects to receive to make it up. The children must select coins to equal both the price and number of coins. The object is to earn as much as possible from Toothy by getting correct answers. These activities have the positive feature of providing help when things go wrong.

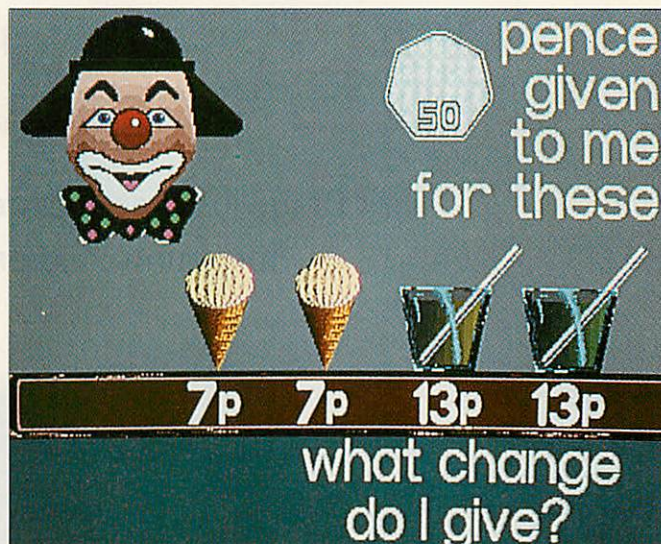
Money Matters is not a teaching program, but it does reinforce what children have already learnt and offers practice activities which would be of help in the classroom as well as at home.

TARGET MATHS

Target Maths is another set of four programs. Designed with eight to 11 year-olds in mind, it is intended to make the exploration of maths enjoyable, relating it to the National Curriculum requirements at key stage two.

The handbook describes *Eliminator* as a fun game which will take the chore out of learning tables, when in fact it does nothing of the sort. Instead it is a challenging task with which to practise and apply multiplication.

Sixteen products are displayed in a square and two factors appear in separate boxes. On the first turn, both factors can be changed, but on subsequent turns only one factor can be altered. To eliminate all the products requires careful planning and in order to obtain 'expert' status, you have to end on the product the computer selects, which is not an easy task when working against the clock.



... and Toothy teaches the virtues of honesty - no short-changing here

Number Facts is based on a knowledge of the properties of prime, square and triangular numbers. The first part allows children to explore numbers and their properties on a hundreds square.

Once confident, they can tackle the second part of the program where, in pairs, they must select numbers that have a chosen property. This is a challenging game which every year five or six classroom should have available.

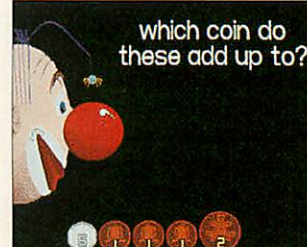
Scale Factor is another program I would be happy to use in my classroom. The four levels give children practice in reading scales using single place decimal numbers.

At the higher levels, addition or subtraction must be performed first, before fitting the result on a scale. What I particularly like about this program is the challenge of finding the right scale for the target number.

Slider is one of the most difficult tasks on the disc. It is similar to snakes-and-ladders but on a hundred square, with no clues as to which numbers represent ladders or snakes.

The task is to discover which of the numbers take you up and which take you down to reach 99 in the lowest number of moves. It sounds complicated at first, but after two games the overall pattern begins to emerge.

Target Maths is a worthy set of programs. I recommend it to both schools and home users, as an extension of number work that the child has learnt at school.



Boingy keeps on asking

CONVERTA KEY

Picture Book and Money Matters both use Triple R's unique plastic keyboard overlays, Converta-Key, designed to make keyboard entry simpler for younger children. It is loaded prior to the software. You are given a choice of a Qwerty arrangement or an alphabetically ordered key strip. The plastic key strips are fastened to the keyboard with the sticky-back velcro supplied. Converta-Key comes with eight sample programs which are of little real value. As most Arc programs for younger children use the mouse to pick letters from the screen, Converta-Key may be of limited value. However, you may want to try using Converta-Key with programs for the BBC B and Master 128, which exclusively use keyboard entry. Although this system works adequately in the home, it can never replace a school's overlay keyboard for convenience, reliability and robustness. Converter-Key costs £8.47 but the stand-alone package is due to be discontinued and there are limited supplies only.



Five of the best for the three Rs

SUMMARY

Most teachers welcome the practice of home-based activities that reinforce what the child is learning at school. But, if a program deals with unfamiliar concepts, it can result in frustration for your child, so it is a good idea to check what you are doing with your child's teacher.

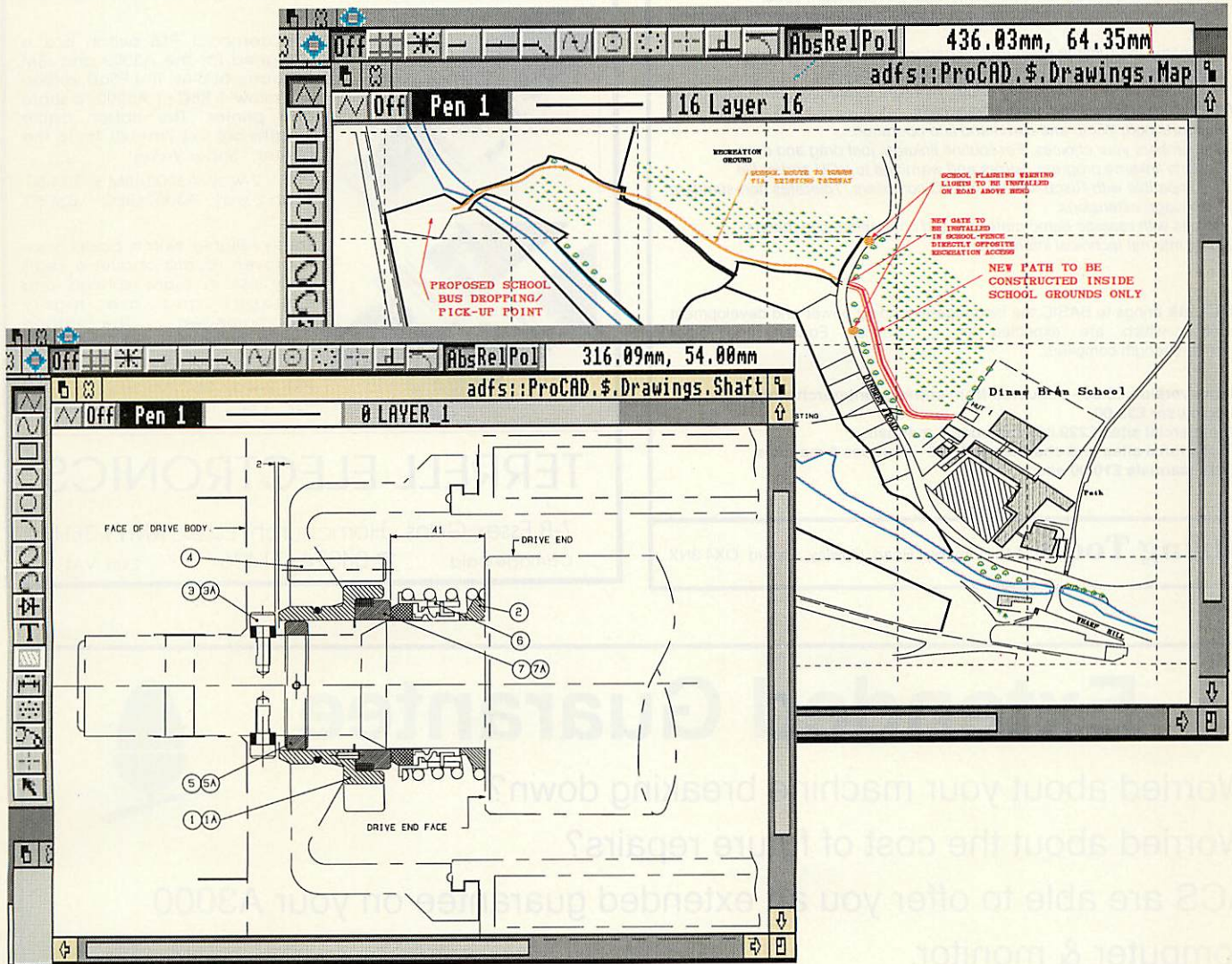
My only real criticism is of *Picture Book*, not just because the banjo chord used as a sound effect grates on the nerves, but because the opportunities provided by the Arc for sound output are too great not to employ 'talking' books as well as sound effects and pictures. But, overall, the programs make up a well thought-out range suited to many ages and abilities.

PRODUCT DETAILS

Products: Converta-Key, Money Matters, Picture Book, Target Maths
Supplier: Triple R Education, 1 Percy Street, Sheffield S3 8AU
Tel: (0742) 700661
Price: £16.97 plus VAT, £8.47 for Converta Key
Machines: BBC B, Master 128,

CADet

*Multi-tasking
RISC OS Compliant
CAD Program*



£149.00

Plus VAT

Site Licence available - please phone for details



MINERVA
SOFTWARE

MINERVA HOUSE, BARING CRESCENT, EXETER, EX1 1TL
Tel. (0392) 437756 Fax. (0392) 421762

Do you use a BBC BASIC Compiler?

IBBCLink will multiply your productivity. **IBBCLink** is a token-level linker for ARM BASIC compilers. Now for the first time, reusable library code can be automatically included in compiled BASIC programs. **IBBCLink**...

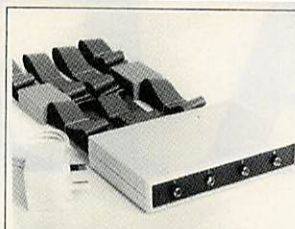
- ☆ *Runs on any Risc OS system in 80K.*
- ☆ *Understands the **LIBRARY** keyword of BBC BASIC - existing BASIC compilers can't.*
- ☆ *Identifies and resolves all references to **LIBRARY** routines. Imports definitions. Generates a standalone BASIC program that can immediately be compiled.*
- ☆ *Links only referenced routines. Generates no redundant code.*
- ☆ *Processes pure BBC BASIC. No non-standard syntax or special directives required.*
- ☆ *Eliminates the runtime memory and performance penalties of "library modules" - as implemented on existing BASIC compilers.*
- ☆ *Handles multiple libraries, any depth of nested references, any order of definitions, intra-library and cross-library calls.*
- ☆ *Supports both Wimp and command line operation.*
- ☆ *Remembers your choices. For routine linkage, just drag and drop.*
- ☆ *Reports linktime progress, errors and warnings to VDU and/or file.*
- ☆ *Is compatible with RiscBASIC and ABC compilers. Tolerates non-standard ABC language extensions.*
- ☆ *Comes with realistic demo materials and comprehensive manual, including internal technical information.*

IBBCLink brings to BASIC the language-extending power and development efficiency which are expected of C, Pascal, Fortran and other industrial-strength compilers.

Demo version £5.00 - deducted from subsequent purchase price.
Single user £39.00.
Commercial sites £229.00 - includes 6 manuals.
Educational sites and charities £189.00 - includes 6 manuals.
Extra manuals £10.00 each.

Turing Tools 149 Campbell Road, Cowley, Oxford OX4 3NX

PRINTER SWITCH-BOXES



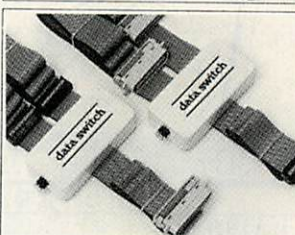
Ideal for schools and colleges. All versions come complete with cables, the 4-way units are fitted with 2x3.7m+2x1.7m+0.6m to the printer. Data buffers are fitted to the extra long 3.7m cables.

PS3 3-way BBC/MASTERS £59.50
PS4 4-way BBC/MASTERS £69.50
PS6 3-way A3000/IBM's £67.50
PS7 4-way A3000/IBM's £77.50



The compact PS5 switch box is designed for the A3000 and IBM PC compatibles. The PSab version will allow 1 BBC+1 A3000 to share one printer. The ribbon cable lengths are 2x1.7m+1x0.4m to the printer. Super Value!

PS5 2-way A3000/IBM's £34.50
PSab 2-way A3000+BBC £34.50



These reliable switch boxes have a proven record of over 6 years daily use in many schools and colleges and are highly recommended. The ribbon cables fitted are 2x1.7m+1x0.4m with appropriate connectors.

PS1 2-way BBC/MASTERS £31.50
PS2 1 BBC to 2 PRINTERS £31.50

TERRELL ELECTRONICS

7-B Essex Gdns., Hornchurch, Essex, RM11 3EH
Carriage paid ☎ 04024 71426 Excl. VAT

Extended Guarantee



Worried about your machine breaking down?

Worried about the cost of future repairs?

ACS are able to offer you an extended guarantee on your A3000 computer & monitor.

For £50+vat your computer & monitor will be covered by a full parts and labour guarantee for an additional year.

This cover also applies to machines already over a year old.



Advanced Computer Services
(Europe) Ltd.

Advanced Computer Services (Europe) Ltd.,
75 Wellington Street,
Luton, Beds., LU1 5AA

Tel: (0582) 20604 Fax: (0582) 480833

Advanced Computer Services are a fully authorised Acorn Service Centre

MODERN ART

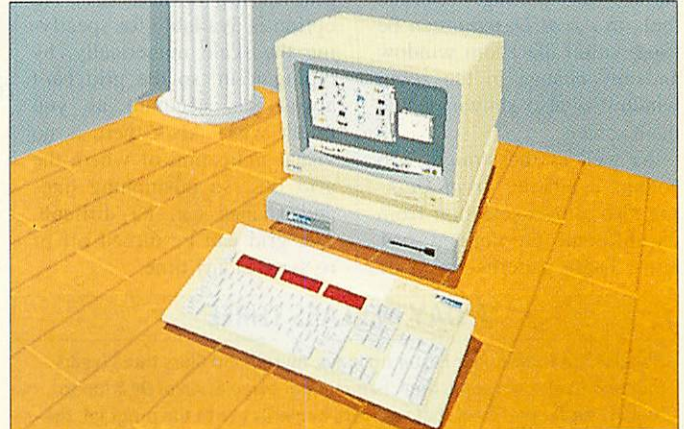
Arcol has at last been brought up to date with a new desktop compatible version. Rob Miller takes a closer look

The original *Arcol* was one of the first art packages for the Archimedes computer and was based entirely in Mode 13, making no use of the Risc OS Wimp interface. Instead, it used its own system of pull-down menus, similar to those found on the Apple Macintosh.

But, at the time, *Arcol* was rather an impressive program, boasting fast sprite handling and comprehensive flood-fill options. It also allowed double screens in the form of two Mode 13 screens, one on top of the other – particularly useful for producing poster-size pictures, which could be printed out using Arcol's own built-in printer driver. A number of other features, such as

support for graphic tablets and a collection of painting effects like blend, wash and recolour, made Arcol one of the best art programs available. However, these days desktop compatibility is an essential part of any application, and so ExpLAN have now released a new version, known aptly enough as *Arcol Desktop*.

Clicking on the *Arcol Desktop* icon takes you directly into a Mode 13 screen with a menu selection bar along the top. A 256 colour palette is also displayed, plus a brush selection menu and an Undo button. The position of the menu-bar and palette is fixed; not much use if you want to select different colours and work in the top area of the screen. The menu-

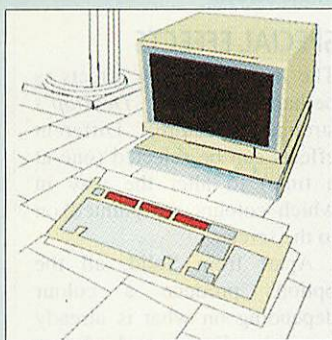


IN ACTION

It is a good idea to start off with a 'wire-frame' sketch of where the various objects will be. A straight line tool is essential for this and comes in useful for creating lines of perspective. Black lines on a white background are easier to view and *Arcol Desktop* allows you to set the background and foreground colours to any one of 256 available.

Lines can be created by marking one point, and then dragging the other point to the desired position. Although the zoom window can be used for accurate positioning, it does tend to 'hop' about if you are drawing lines from one side of the screen to the other, or working in the middle. After completing the sketch, unwanted lines can be removed using either a white brush, or rubout. Rubout is very useful and allows any current tool to use the background colour (as opposed to the foreground colour) by using the Adjust button instead of the Select button. The next step is to fill all the blank areas with the desired colours. All colours can be selected from the colour bar, or by 'picking' them off screen. A special 'hot-key' allows 'pick' to be selected without going through a menu. One feature not found in any other art package is Re-shape sprite; used to create the picture on the monitor. The sprite was 'grabbed' directly from the desktop using *Arcol Desktop's* Grab Screen Area tool.

Finally, detail such as shadow was added to give depth. *Arcol Desktop* has a number of effects to allow blending of colour on screen. Pre-cut out sprites can be used as brush shapes, making the creation of drop shadows simple, such as the pillar on the left of the picture.



bar/palette can be toggled on and off, but this means that choosing a new colour involves switching the palette on, selecting the colour, and then switching it back off. However, hot key short cuts are provided for most tools and this goes some way towards rectifying this problem.

One final problem with the menu bar, is inherent from the first release of *Arcol*. Any graphics that are drawn or deleted while the menu bar is on are unaffected. This means, for example, that clearing a screen with the menu bar on, leaves a strip along the top of the screen where the menu bar was. Not particularly drastic, but nonetheless an irritation that ExpLAN have promised to look into.

TOOLS OF THE TRADE

Arcol Desktop is divided into six groups. Tools, Edit, Screen, Effects, Sprites and Text. All six have sub-menus from which individual tools or options can be selected.

Tools contains all the graphic primitives; lines, curves, triangles and ellipses and so on. Single points can be plotted and a sketch option allows for freehand drawing. A Spray Can tool works well, especially in high resolution

modes where the pixels produce a realistic blurred effect.

A comprehensive set of fill options allow objects to be shaded in a number of ways. Horizontal, vertical and circular graded fills are all possible, plus an in-between option that changes the shape of the fill depending on the shape of the object being shaded.

Graded fills can contain up to 16 different colours which are defined by altering a special fill palette. Any colours out of the 256 available can be used, although colours that 'fit together' work best. Unlike some other art packages, there is no option to define a fill palette by selecting a start and end colour.

There are however, a number of pre-defined palette fills that are supplied with *Arcol Desktop*. These include all the primary colours from black up to full saturation, plus full saturation up to white and they can be loaded, in place of the default settings, via the main palette menu.

The level of dithering, using alternate coloured pixels to produce a 'third' colour between the colours in a fill can be altered from zero, which specifies no dithering at all, up to nine, giving extreme dithering.

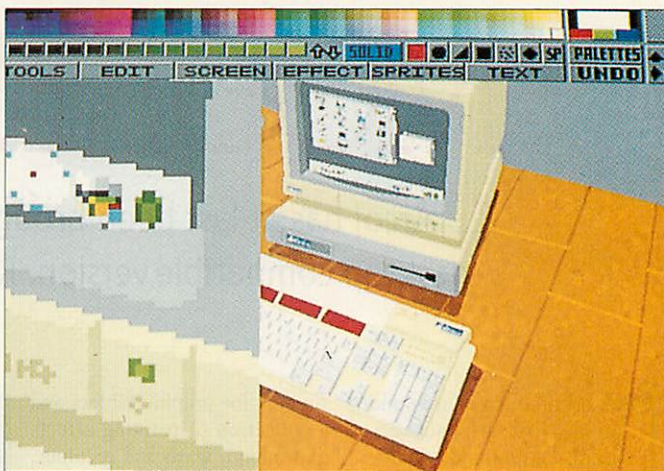
IN CLOSE UP

One of the most vital parts of any art package is the zoom tool. In *Arcol Desktop*, a fixed 'window' is used to display an enlarged area of the screen. Any part can be enlarged by positioning a small rectangle (scaled to show the resolution of the zoom) over the desired area. The zoom window can then be scrolled up, down, left or right, and enlarged or shrunk for editing. All the tools in *Arcol Desktop* can be used within the zoom window and any change in the zoom window is also shown on the main screen.

As well as the straight 256 colours available, *Arcol Desktop* also allows selection from 28 different pre-defined patterns. These patterns are made

up of 4 x 8 blocks which can be altered using a built-in editor. New patterns can be saved or loaded from disc to supplement the default selection. When a pattern is selected, it is used as the 'colour' for all successive operations so that you can define your own patterns.

The remainder of the edit options effect the whole screen. The pointer movement can be locked to a definable scale and is set by stretching a grid to the desired size. No option is available for specifying the scale numerically, by typing it in, so the grid isn't always as accurate as you might wish. Also, there is no visual indication of where the grid lies, so positioning lines and shapes can be difficult. The grid can be turned off or re-sized at any time.



Zooming in on a pictorial detail

A picture can be cleared at any time to the currently selected background colour, oddly enough for such a drastic action, no check is made before the picture is deleted although you can resort to the Undo option which allows you to backstep the last action.

Undo can be selected from three different places; the main menu, the Edit sub-menu and through the hot key U, and this is one point where the menu bar problem becomes apparent. Selecting Undo via the menu bar only undoes the part of the screen not obscured by the menu bar, leaving an unwanted strip across the top of the screen.

SPECIAL EFFECTS

The list of painting effects is perhaps *Arcol Desktop's* strongest feature. Different effects can be selected (one at a time) to alter the way in which colours are painted on to the screen.

Apart from Solid, all the options produce a colour depending on what is already on screen. For example, Invert changes the colour of all pixels to their opposite; rather like looking at a colour photograph negative. Wash and Blend both have the effect of mixing the currently selected colour with that on screen.

Recolour, Cycle, Anneal and B&W all swap the current colour for another. Recolour requires two 'fill palettes' to be selected and swaps any colour from the first to its equivalent in the second. Cycle uses a 'fill palette' as a look-up table and changes any one colour to the next in the list. Anneal has a similar effect

but uses the full 256 colour palette as the table. B&W changes all colours to their grey-scale equivalent.

SPRITES AND TEXT

Sprites can be altered in a number of ways, the most impressive of which are Stretch and Rotate/Scale. A sprite can be reshaped to fit into any four-sided shape or squashed into a ball. All sprite manipulation is carried out in real-time; for instance a sprite will actually rotate as you move the mouse, and is most impressive, especially on Arm3 based machines.

The text option provides a number of fonts which you can use for captioning and labelling. No use is made of Risc OS outline fonts, although it is possible to use *Arcol Desktop's* snapshot facility to 'grab' words as sprites, from a Draw window on the desktop.

The supplied fonts are all bitmaps (made up of a grid of pixels) and so they cannot be scaled in size, without losing quality. They do, however, provide a quick method of adding text to a picture. Twelve text styles are supplied with *Arcol Desktop* and new ones can be created with the built-in font editor.

SCHOOL WORK

Arcol Desktop is aimed mainly at schools and so a selection of worksheets have been designed to illustrate various ideas relating to the program. They cover topics such as colour separation, shading effects and general design.

Nine worksheets are available and all can be copied for use in the classroom. All the

A DAY IN CLASS THREE

One day, just before our Easter holidays, myself and Class three (years four and five) spent some time 'hammering' away at *Arcol Desktop* to check it for faults. Given that we were beginners with the program, the children's efforts were largely experimental, using the numerous possible effects. Although we did not produce a vast number of completed pictures in this short space of time, we did manage to get some examples and also jot down some thoughts about the program. We particularly liked the single main menu at the top of the page. It is frugal with space and its easy to operate. Most options were easy to use: we found the Zoom and Undo options particularly useful and one 'short cut' options that we liked was Pickcolour. Also Cycle, Shade fill, Wash and Blend proved very popular and the palettes can supply a good choice of colour. We preferred to have the words printed in the options rather than symbols and changing the menu title from Mode to Effect has made its purpose clearer. Overall, *Arcol Desktop* is much preferred to the original program as we can now run more than one program at a time.

Mr Mackey, Lea Primary School



worksheets are clear and informative with examples where appropriate. Perhaps the only minus point is that they are in black and white.

A disc is supplied with the worksheets which includes files relating to the topics discussed. The worksheet kit costs extra (see product detail box) but is included free with an *Arcol Desktop* site licence

THE COMPETITION

Of course, few applications are released into a vacuum and in order to succeed, *Arcol Desktop* will have to compete against other graphics applications, such as *Atelier* and *Revelation 2*.

Atelier is the oldest program of the three and certainly shows it, with its pre-Risc OS front end. It is also limited to Mode 15 (640 x 256) graphics so that any pictures produced with it look relatively chunky.

Like *Arcol Desktop*, it runs from the desktop but uses a separate screen when the program is actually running. A single pop-up menu gives access to a number of sub-menus that contain the various tools to produce the artwork.

Accurate line drawing is simplified by the cross-hair window which is permanently on. This gives a magnified view of the part of the screen that the pointer is currently over. Simple pixel editing can also be done without having to have a special zoom window. Perspective lines are simple to create using the ray tool. This allows lines to be drawn from the same start point, for example, a vanishing point.

Atelier contains virtually every fill imaginable, apart from the multi-directional fill found in *Revelation 2*. Graded fills can contain up to sixteen shades and new selections can be created by specifying the start and end colours, as in *Revelation 2*.

Shadowing and highlighting are possible with the blend option. No facility is available to use cut-outs as brush shapes, so all shadowing/lighting must be drawn by hand.

Revelation 2 is by far the fastest art package on the Archimedes, even though it runs entirely on the Risc OS desktop. This means that all the tools have a more respon-

sive feel. Lines can be dragged around the screen without any delay between the mouse pointer and the end of the line. Line drawings are therefore particularly easy to create.

The zoom tool in *Revelation 2* just consists of a new window in which a magnified version of the current picture is displayed. Any number of zoom windows can be created and any magnification can be set from 1/4 to eight times that of the original.

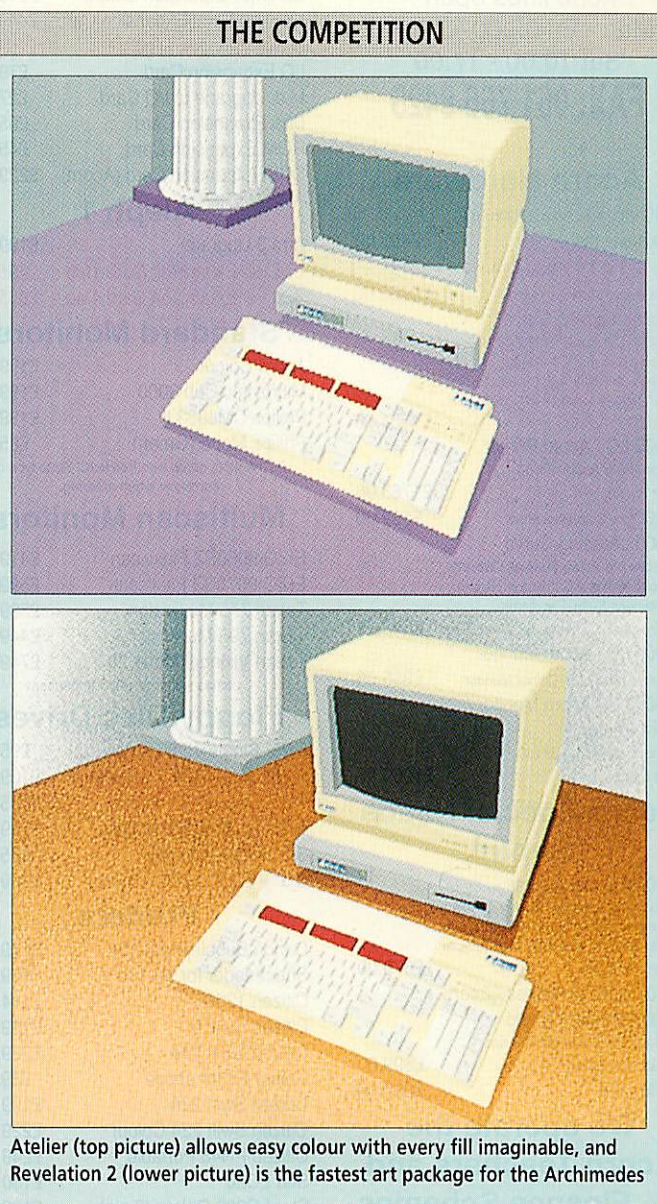
By using a zoom window, accurate line drawing is easy, even across the full width of the picture. If you have a large magnification set, the window automatically scrolls if the pointer is dragged outside the visible area. Movement around a zoom window is also made easier with the 'hand' (or pan) tool. This allows a window to be scrolled around in any direction.

Revelation 2 is the only art package (at present) to have 'any-direction' graded fills. To create a greyscale running from the bottom left to the top right of an area, just select the start point and end point, and it will fill between the two. Up to sixteen colours can be used for graduated fills. *Revelation* will 'calculate' any selection given the start and end colours. Creating shadows in *Revelation 2* is possible by washing (blending) black with an existing colour. No facility exists to use cut-outs as brush shapes, so all shadows must be drawn in by hand. An overall 'softening' of a picture can achieve a more realistic picture by removing all the jaggedness of lines. The 'blur' tool was used across the whole scene simply by dragging a box over the entire area.

WHAT'S NEW?

Unlike the original program, *Arcol Desktop* allows you to edit pictures in any 256 colour mode. A new mode is selected from the Risc OS desktop and used in any further editing. Any existing pictures or sprites are automatically converted into the new mode.

Sprites can now be imported from any other 256 colour mode. Currently available sprites are shown in a window on the Risc OS desktop in a similar way to *Paint*. New



Atelier (top picture) allows easy colour with every fill imaginable, and *Revelation 2* (lower picture) is the fastest art package for the Archimedes

sprites can be added to the pool by just dropping them onto this window. Selection is also done via the desktop by clicking on the desired sprite.

All sprite and screen, saving and loading is now carried out from the desktop. Printing is now possible from the desktop via the standard Risc OS printer drivers and a special option allows posters to be printed on multiple sheets.

CONCLUSION

In the light of recent art packages, *Arcol Desktop* looks rather dated. The attempt at incorporating what effectively is a stand-alone program into the desktop environment, only partially works. The need to switch to and from the desktop, each time you wish to load or select a new sprite, is very awkward. And because

the bulk of the program is not Risc OS-like, it can be confusing to the untrained user.

However, in terms of value, *Arcol Desktop* is very good good buy: £50 is not a high price to pay for so many features. But if ExpLAN want *Arcol Desktop* to be a serious contender to *Revelation 2*, a third release would have to be fully desktop compatible.

PRODUCT DETAILS

Product: *Arcol Desktop*
Supplier: ExpLAN UK Limited,
20 Plymouth Road, Tavistock,
Devon, PL19 8AY
Tel: (0822) 613868
Price: £50; site licence (inc
school worksheets) £250; sep-
arate worksheets £12; upgrade
£6.50.
All prices exclude VAT.
Machines: Arc, A3000



061 766 8423

Phone lines open :-
Mon - Fri 09.00 - 17.00
Sat 10.00 - 17.00
FAX: 061 766 8425

Acorn Hardware

A540 inc. 4Mb Ram, 120Mb HD,	
Arm3, Taxan 775	£2495.00
A5000 inc. 2Mb Ram, 40Mb HD,	
Arm3, Acorn Multiscan Monitor	£1499.00
A5000 Learning Curve	
as above c/w Audio Training Cassette,	
Guide to National Curriculum, Acorn	
Applications Suite, Pacmania,	
PC Emulator, Genesis, 1st word Plus,	
Acorn DTP	£1531.06
A5000 LC / Acorn Printer	
as above c/w Acorn JP150	
Inkjet Printer	£1765.96
A3000 c/w 2Mb Ram fitted	£599.00
A3000 Learning Curve	
as above c/w Audio Training Cassette,	
Guide to National Curriculum, Acorn	
Applications Suite, Pacmania,	
PC Emulator, Genesis, 1st Word Plus	£642.29
A3000 LC / Acorn Monitor	
as above c/w Acorn Colour Monitor	£855.05
A3000 LC / Acorn Monitor /	
Acorn Printer	
as above c/w Acorn JP150	
Inkjet Printer	£1089.95

Acorn Special Needs Centre

A3000 Special Access	
Acorn Serial Upgrade, Morley User/Analogue	
Expansion Card, Acorn Software Suite,	
Utilities Disc, SEMERC & ACE Special	
Needs Handbook	£679.00
A3000 Special Access / Acorn	
Colour Monitor / Stand	
as above c/w Acorn Monitor and	
Pres Monitor Stand	£899.00
Master 128	£399.00

We operate the Acorn Teachers and 0% Finance Schemes

Please call for free information pack

A540 Upgrades

4Mb Ram Upgrade	£369.00
Taxan 795 VIDC Modes Disc	£7.50
Technical Reference Manual	£65.00

A5000 Upgrades

2Mb Ram Card	£110.00
Technical Reference Manual	£65.00

A400 Upgrades

1 Mb Ram	£35.00
2 Mb Ram	£65.00
3 Mb Ram	£99.00
20 Mb Hard Disc (ST506)	£145.00
40 Mb Hard Disc (ST506)	£245.00
5.25" Ext. floppy disc int.	£39.00
ARM 3 Upgrade (Aleph 1)	£199.00
Econet Module	£46.00
VIDC Enhancer	£29.00

A3000 Upgrades

1 Mb Ram (2 Mb in total)	£55.00
4 Mb Ram	£159.00
20 Mb Int Hard Disc (IDE)	£199.00
5.25" External f/disc buffer	£39.00
Serial Upgrade	£19.00
Serial Link Kit (BBC-Arc)	£14.00
User & Analogue Podule	£46.00
User & Midi Podule	£46.00

Expansion Cards

ArVis S-VHS Video Board	£295.00
ArVis S-VHS Encoder Board	£145.00
ArVis Video Graphics Board	£877.00
Chroma 345 Overlay Board	£389.00
Econet Module	£46.00
Ethernet Expansion Card II	£249.00
Floating Point Expansion Card	£449.00
Hawk V9 Video Digitiser	£199.00
I/O Expansion Card	£79.00
Midi Upgrade to I/O Card	£27.00
Midi Expansion Card	£65.00
ROM Expansion Card	£45.00
SCSI Expansion Card (Acorn)	£229.00

Aleph 1

Arm 3 Upgrade	£199.00
386 PC Expansion Card 1Mb	£495.00
386 PC Expansion Card 4Mb	£595.00

Standard Monitors

Acorn Colour	£199.00
Microvitec Cub 3000	£199.00
Philips CM8833 II	£199.00
Philips Mono (Green)	£85.00

All monitors come with free lead. State type of computer when ordering.

Multiscan Monitors

EIZO 9060SZ Flexiscan	£419.00
EIZO 9070SZ Flexiscan *	£599.00
Taxan 775 Multivision	£389.00
Taxan 795 Multivision *	£449.00
Taxan Viking II Mode 23	£749.00

* comes with free VIDC enhancer.

Floppy Disc Drives

5.25" Single 40/80 no psu	£95.00
5.25" Single 40/80 with psu	£109.00
5.25" Dual 40/80 no psu	£185.00
5.25" Dual 40/80 with psu	£199.00
3.5" Single with psu	£85.00
3.5" + 5.25" 40/80 with psu	£209.00

Printers

Canon Bubblejet BJ-10e	£219.00
Sheetfeeder for BJ-10e	£59.00
Citizen 120D+	£114.00
Citizen Swift 9	£169.00
Citizen Swift 24e	£239.00
Colour Kit for above	£39.00
Citizen Swift 224	£199.00
Citizen Swift 224 Colour	£229.00
Citizen PN48 Portable	£249.00
Star LC20	£130.00
Star LC200 Colour (9 pin)	£189.00
Star LC24 - 200	£219.00
Star LC24 - 200 COLOUR	£259.00
Sheetfeeder for LC24 - 200	£69.00
Integrex Colourjet 132	£519.00
HP Deskjet 500	£339.00
HP DeskJet 500C	£599.00
HP Paintjet	£695.00
Laser Direct (Qume)	£749.00
Laser Direct (LBP4 Hi Res.)	£899.00
Laser Direct (LBP8 Hi Res.)	£1289.00

Oak Solutions

Worra Winnie (SCSI)

Call for current prices

Oak Recorder	£29.00
--------------	--------

Econet

Broadcast Loader	£60.00
Level 4 Software	£199.00
Cable - 100m	£90.00
Econet Starter Kit	£80.00

Fax

Fax Pack (CC)	£299.00
---------------	---------

Scanners

Flatbed A4 256 Grey SCSI (CC)	£849.00
Flatbed A4 with SCSI card	£949.00
Scan Junior Scanner A6	£129.00
Scanlight Senior Scanner A4	£289.00
Sheet Feeder for above A4	£105.00

Printer Drivers

Midnight Graphics

Citizen Swift 9 Sprite Dump	£26.04
Citizen Swift 24 Sprite Dump	£26.04
Epson 24 Sprite Dump	£26.04
HP Deskjet 500C Sprite Dump	£26.04
HP Paintjet Sprite Dump	£26.04
Integrex 132 Sprite Dump	£26.04
Integrex Colourcel Sprite Dump	£26.04
Juki 5520 Sprite Dump	£26.04
Star LC10 Sprite Dump	£26.04
Star XB24 Sprite Dump	£26.04
Star LC200 Sprite Dump	£26.04
Star LC24-200 Sprite Dump	£26.04

Ace Computing

Printer JX (Colour Dot Matrix)	£14.00
Printer DJ (Deskjet 500C)	£14.00
Printer PJ (Paintjet)	£14.00
Printer CA (Canon Colour)	£14.00

Electronic Font Foundry

BubbleJet - BJ10e/130e	£10.00
------------------------	--------

Cables

Arc - Monitor - 8833 inc sound	£8.65
Arc - Monitor - 8833 II inc sound	£8.65
Arc - Parallel Printer Cable	£5.00
Keyboard Extender 400/500	£7.50
Mouse Extender	£7.50
Replacement Mk I Mouse Cable	£6.50

BBC Software

Blob 1	£18.00
Blob 2	£18.00
Chick Chase (80 Track Only)	£15.00
E-Type	£13.00
Imogen	£9.95
Kourtyard	£9.95
Master Break	£10.39
Mini Office II	£17.35
Modem Master	£11.26
Play it Again Sam No's 1 - 16 ea.	£11.95
Reversals (80 Track Only)	£20.00
UIM	£14.95
Where's Blob	£18.00
White Knight	£18.00
White Magic	£11.26

Master Compact

Play It Again Sam No's 1 - 16 ea.	£13.00
UIM	£14.95
ViewPlot	£29.95
ViewSheet	£40.00
ViewStore	£45.00

Archimedes Software

4 Mation

Chameleon	£25.00
Craftshop 1	£29.00
Craftshop 2	£29.00
Jiglet	£29.00
Jigsaw	£29.00
Poster	£75.00
SmArt	£55.00
SmArtFiler	£35.00
Snippet	£29.00

Ace Computing

ArcLight	£43.00
Euclid	£40.00
Mogul	£17.00
Splice	£26.00
Tween	£26.00

Acorn Computers

1st Word Plus	£65.00
ANSI C (V 3)	£125.00
Acorn Desktop Publisher	£109.00
Desktop Assembler (V 2)	£119.00
Desktop C (V 4)	£185.00
Font Starter Pack	£39.00
Fortran 77	£99.00
ISO Pascal	£99.00
Newhall Font Pack	£39.00
PC Emulator / Free Shareware	£99.00
Symbol Font Pack	£39.00

TCP/IP Programers Pack	£50.00
TCP/IP Protocol Suite	£199.00
Twin	£25.00

Arxe Systems

MultiFS	£27.00
---------	--------

Beebug

Hearsay	£59.00
Ovation	£79.00

Brilliant Computing

Everyday Signs	£20.00
Joystick Games	£20.00
Streetwise	£20.00
Switch On	£20.00
Switch On Actions	£20.00
Teds Adventures	£20.00

Cambridge International Software

Fireball II	£10.00
Mah-Jong Patience	£15.00
Mental Maths	£15.00
Microdrive	£14.00

Clares Micro Supplies

Artisan 2	£45.00
Illusionist	£79.00
Interdicator	£10.00
Intèrdicator II	£25.00
ProArtisan	£70.00
Render Bender 2	£99.00
Rhapsody 2	£45.00
Schema	£90.00

Colton Software

Pipedream 3	£105.00
Pipedream 4	£179.00

Computer Concepts

AvanteGarde Font Pack	£24.00
ArtWorks	£TBA
Bookman Font Pack	£24.00
Compression	£39.00
Equisor	£39.00
Impression II Borders Disc	£12.00
Impression Business Supplement	£39.00
Impression II Free Drawfile Disc	£125.00
Impression Junior	£70.00
Inter-Word	£29.00
Show Page	£109.00

Cygnus Software

Iron Lord	£14.00
Tower of Babel	£14.00
Twin World	£14.00

Dabs Press

Arc DFS	£22.00
---------	--------

Database Software

Fun School 2 6-8 year olds	£14.95
Fun School 2 over 8s	£14.95
Fun School 2 under 6s	£14.95
Fun School 3 under 5s	£19.95
Fun School 3 5-7 year olds	£19.95
Fun School 3 Over 7s	£19.95

Domark

Mig29 Fulcrum	£24.00
Mig29 Super Fulcrum	£32.00
Trivial Pursuit	£22.00

Empire

Pipemania	£16.00
-----------	--------

Electromusic Research

Creations Discs 1-8 ea.	£19.00
MIDI Analyser	£29.00
Microstudio	£78.00
Music Player	£35.00
RhythmBox	£29.00
SoundSynth	£39.00
Studio 24 Plus	£149.00

ESM

Desktop Folio	£79.00
---------------	--------

Hybrid

Elite	£32.99
-------	--------

Icon Technology

EasiWriter	£115.00
------------	---------

Krisalis Software

Chuck Rock	£19.00
James Pond	£20.00

Lemmings	£20.00
Mad Professor Mariarti	£14.00
Manchester United Europe	£19.00
Swiv	£20.00
World Champ. Boxing Manager	£19.00
World Championship Squash	£18.00
Linguinity	
HotLink Presenter	£34.00
Presenter II	£29.00
Longman Logotron	
ArcComm 2	£54.00
Landmarks No's 1 - 4 each	£19.00
Magpie	£54.00
Notate	£55.00
Numerator	£60.00
Pendown	£54.00
Pendown Outline Fonts	£18.00
Pinpoint	£69.00
Pinpoint Junior	£24.00
Revelation 2	£99.00
SkyHunter	£24.00

Magnetic Scrolls	
Collection 1 (3 Adventures)	£29.50
Wonderland	£24.00

MicroPower	
Chess 3D	£14.00
Zelanites	£15.00

Midnight Graphics	
ClipArt 1 over 480 images	£29.95
ClipArt 2 over 350 images	£29.95
Express	£51.02
Tracer	£52.13

Minerva Software	
Applications	
Ancestry	£59.00
Atelier	£69.00
Desktop Office	£79.00
Easiword	£19.00
Flexifile	£89.00
Graphbox	£60.00
Graphbox Professional	£109.00
Home/Club Accounts	£35.00
Multistore II	£179.00
PCAccess	£19.00
PrimeArt	£69.00
Timetabler	£599.00

Leisure	
Bughunter in Space	£13.00
Bug Hunter / Moon Dash	£13.00
Casino	£13.00
Caverns	£13.00
Family Favorites	£13.00
Freddy's Folly	£13.00

Hoverbod	£13.00
Ibix the Viking	£13.00
Jet Fighter	£13.00
Maddingly Hall	£13.00
Orion	£13.00
Redshift	£13.00
Talisman	£13.00
Thundermonk	£13.00

Northwest SEMERC *	
Compose World	£48.00
Compose World Files 1	£12.00
Compose World Voice Pack 1	£15.00
Conform Keyboard Software	£15.00
La Monde a Moi	£15.00
My World (Program)	£15.00
My World - Design	£7.50
My World - I'm Special	£7.50
My World - Nursery Disc	£7.50
My World - Maths	£7.50
My World - Patterns	£7.50
My World - Sampler	£7.50
My World - Skeletons	£7.50
My World - Village/Town	£7.50
Oldham Keyboard	£125.00
Phases 2	£15.00
Phases - Borders disc	£7.50
Phases - Christmas disc	£7.50
Phases - Clip Art 1	£7.50
Phases - Very Hungry Caterpillar	£7.50

* Please add £2.50 P&P to SEMERC Software

Oak Solutions	
Disc Sharer	£119.00
Genesis	£40.00
Genesis Plus	£69.00
Genesis II	£99.00
Oak Recorder	£29.00
Parametric Design Tool	£359.00
Printer Spooler	£65.00
Remote Logon	£34.00
Worra Battle	£14.00
Worra Plotter	£24.00
WorraCAD	£74.00

Sherston Software	
IDraw Help	£15.95
IHelp	£7.95
Animated Alphabet	£19.00
Arcventure	£25.00
Dreamtime	£20.00
Farm	£19.00
Fleet Street Phantom	£23.00
Glimpse	£8.50
Mapventure	£23.00
Microbugs	£25.00
Nature Park Adventure	£24.50

Selladore Tales	£24.00
Space Mission Mada	£23.00
Stig of the Dump	£22.00
Teachers Cupboard	£24.50
Teddy Bears Picnic	£23.00
Viewpoints	£35.00
Wizards Revenge	£17.00
Worst Witch	£21.50

Silicon Vision Ltd	
ARC-PCB	£149.00
ARC-PCB Professional	£299.00
Data Vision	£119.00
FILM-Maker	£70.00
Financial Accountant	£199.00
Realtime Solids Modeller	£149.00
RiscBASIC	£119.00
RoboLOGO	£70.00
ShareHolder	£149.00
SolidCAD	£119.00
SolidTOOLS	£299.00
SolidsRENDER	£119.00
SuperPlot	£29.00

SIMMIS	
Flight Sim Toolkit	£38.00

Superior Software	
Air Supremacy	£14.00
Conqueror	£15.00
Hostages	£14.00
Master Break	£14.00
Repton 3	£14.00
Speech!	£14.00
Superior Golf	£14.00
Zarch	£14.00

The Data Store	
FontFX	£9.95
ShapeFX	£9.95

The Fourth Dimension	
Apocalypse	£14.00
Arcade Soccer	£14.00
Articulate	£14.00
Artist	£14.00
Boogie Buggy	£14.00
Break 147 / Superpool	£18.00
Cataclysm	£18.00
Chocks Away 2	£15.00
Chocks Away Extra Missions	£14.00
Chocks Away 2 + Ext. Missions	£27.00
Drop Ship	£13.00
E-Type Compendium	£18.00
E-Type Designer	£13.00
E-Type Extra 100 miles	£13.00
Enter The Realm	£18.00
Grievous Bodily 'ARM	£18.00
Holed Out Compendium	£18.00
Holed Out - Designer	£13.00
Holed Out - Extra Courses Vol 1	£13.00
Holed Out - Extra Courses Vol 2	£13.00
Inertia	£14.00
Man at Arms	£14.00
Nevryon	£14.00
Pandora's Box	£18.00
Powerband	£14.00
Pysanki	£14.00
Saloon Cars	£18.00
The Olympics	£14.00
The Real McCoy 1	£20.00
The Real McCoy 2	£20.00
The Wimp Game	£14.00
U.I.M	£18.00
White Magic	£14.00
White Magic 2 inc Designer	£14.00
X-Fire	£18.00

The Serial Port	
ARCterm 7	£69.00
Investigator II	£22.00
Joystick Interface	£23.00
Tracker	£37.00

Triple R Education	
Converta-Key	£14.00
Data Word	£14.00
Money Matters	£14.00
Picture Book	£14.00
Target Maths	£14.00

Books (No VAT)

Archimedes Assembly Language	£14.95
Archimedes Operating System	£14.95
C: A Dabhand Guide	£14.95
The above books have accompanying discs add £5 for 5.25", £7 for 3.5"	
A3000 Technical Guide	£29.95
ANSI C Version 3	£17.00
Acorn DTP	£10.00
Assembler Release 2	£25.00
BASIC V: A Dabhand Guide	£9.95
BBC Basic Guide (Acorn)	£19.95
Budget DTP (Draw & Edit)	£12.95
DTP Seeds (4Mation)	£8.45
Desktop C Release 4	£25.00
Desktop Development UG	£25.00
First Word Plus V2	£10.00
M128 Ref. Man.Pts 1&2 (ea.)	£14.95
Programming in Ansi C	£14.95
RISCOS PRM's	£79.00

Hours of Opening

Monday - Friday 9.00 a.m. - 5.00 p.m.
Saturday 10.00 a.m. - 5.00 p.m.
Lunch 1.00 p.m. - 1.30 p.m.

How to find us



Important Facts

- **NO Minimum Order Value**
- **NO Carriage Charges in Mainland UK**
- **ALL Goods Despatched within 24 Hours, subject to stock levels**
- **Acorn Qualified Dealer**
- **Acorn Service Centre**
- **Hotline Support on all Hardware and Software purchased from us**

Terms & Conditions

TERMS: UK residents add 17.5% VAT to all prices, except books. Delivery FREE on all postal items in the UK. Foreign orders, no VAT, carriage at cost. (quotations available). Access/Visa cards accepted. Dabhand Computing Ltd. is a Qualified Acorn dealer. Official orders accepted from public sector/education/PLCs, otherwise cash with order. Tender invitations welcome. Callers welcome. We are 800 yds north of J17, M62. Prices subject to change without notification. Goods offered subject to being unsold.



**DABHAND
COMPUTING**

DABHAND COMPUTING LTD
5 Victoria Lane
Whitefield
Manchester, M25 6AL



The Ultimate Graphical Presentation Package

Please call for Launch Pack and Sample disc - Price £51.02



GAME SHOW

British olympic stars, such as Fatima Whitbread and Linford Christie, are lending their personas to a new game being produced by Krisalis Software with help from Acorn. Provisionally entitled *Quest for Gold*, the five-event game will be the only athletics simulation available for Risc OS machines apart from the rather disappointing *The Olympics*, released by The Fourth Dimension three years ago. It will fill an otherwise obvious gap when Olympic-mania hits planet earth in July.

The game, to be released on all formats in June, will be structured in a similar way to other Krisalis' sports games, comprising two parts: a management section, in which the

athletes are trained and an arcade section, where they actually compete.

In training, the athletes' progress can be analysed with the help of graphs and charts. Digitised video footage of Fatima et al can offer advice and clues whenever a dilemma is reached, though as a respected trainer your word is definitely final!

The arcade part is split into five events: hurdles, 100 metres, high jump, long jump and javelin throwing. Players are represented on screen as large digitised images of real athletes rather than the drawn sprites that most games use. According to the producers, this makes motion very realistic and it looks 'superb'. The game will accommodate up to

four human players and in multi-participant events, such as the 100 metre sprint, each successive player will see a replay image of the previous effort running along side. This provides something to compete against, given that it is not possible to squeeze four people comfortably onto one keyboard to race together.

The endorsement of six famous athletes in *Quest for Gold* (an exclusive feature of the Acorn version) will undoubtedly be a great boon for the game. And if, for some reason, you aren't their greatest fan you will appreciate one aspect of the management section, where you may cunningly over-train the competitors to the extent that they keel over with exhaustion and die!

Bad news from The Fourth Dimension: *Spitfire Fury* and *The Exotic Adventures of Sylvia Lain* have been cancelled due to 'author problems' before completion, despite advertising since well before Christmas. Production director, Mark Botterill said, 'We have never specified a price for *Spitfire Fury* so no-one sent us any money and all cheques for *Sylvia Lain* will be returned uncashed. Hopefully was printed by the expected release dates on our ads and we have never claimed they were ready to buy.' Expressing regret at the losses he added: 'It is possible that *Spitfire Fury* will be finished off next year but I don't advise anybody to hold their breath.'

Sam Greenhill

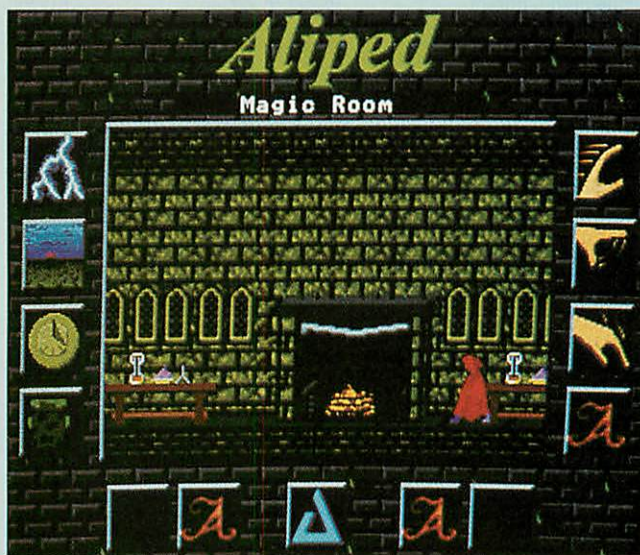
ALIPED

Tel: 061-773 8632
All Risc OS machines
£14.95 plus VAT

Apparently you wish to marry Natasha. Apparently her evil step mother has put a nasty spell on you. Apparently you are imprisoned in a deserted castle. Apparently you have five days to find a counter spell or die in the attempt. Unfortunately I've played more interesting magazine type-in games.

You wander around a castle, which seems to be mainly stairs, trying to find the bits and pieces needed for your spell. I played through the entire game with the help of a written solution but, try as I might, I could see no clues, no matter how subtle, as to what I was actually meant to be doing.

To break the tedium of the endless stairs and corridors there is an occasional log fire but its crackling can be heard almost continually which is very irritating as there is no sound on/off control. The sound is actually stereo with the crackling moving between



Aliped: A game that seems to be stuck in the eighties

the speakers as you walk past the fires. Unfortunately I found one fire where the sound got stuck on the right channel and from then on all sounds came entirely from the right!

The game is side view and for some reason north is up, as opposed to forwards. Controlling your wing-footed character, via keys or the mouse, is unbelievably difficult as movement is based on the absolute position of the mouse

pointer on the screen rather than in relation to your figure. Picking up objects as you walk by them also involves many frantic mouse clicks, with more than one button.

There are two sorts of doors: side on ones that creak very loudly and don't give you your key back, and head on ones which don't eat your key but need a combination of mouse clicks to open. At least one door I found was wide open

one way and locked the other, so you can actually get trapped behind it! Mouse clicking only works when the pointer is inactive in the central area of the screen but, as your character can move around the whole screen, it makes doing anything a very tricky proposition indeed.

There are no baddies to avoid or shoot and very few logic puzzles, just an awful lot of stairs. The only real puzzle I encountered, by following the instructions, could be avoided by doing things in a different order.

This game has a 1988-ish feel to it, which is not surprising really, as Dabs Press has been promising *Aliped* since the release of *Alerion*. The back of the box claims 'stunning use of stereo sound' and 'graphic defocusing found only in the highest quality animation sequences to enhance depth perception'.

I'm just a tad disappointed that this means a handful of crackling fires and a couple of blurred background sprites. Caveat emptor - don't waste your money.

Danny Lanfranc

PESKY MUSKRATS

Coin-Age

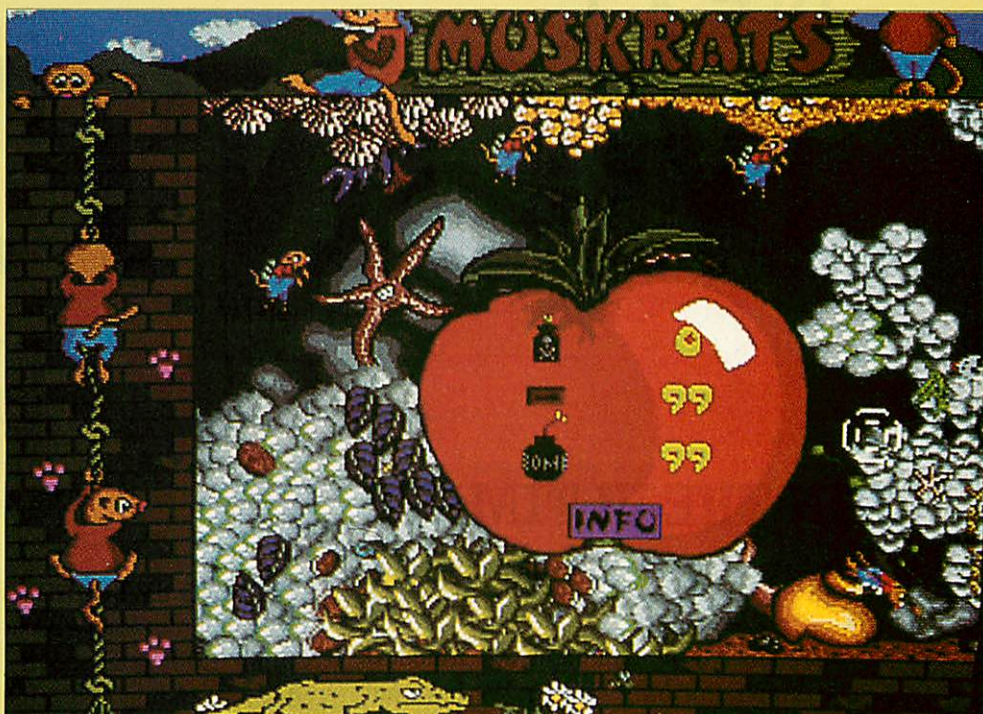
Tel: (0282) 692688

All Risc OS Machines

£25.99 plus VAT

According to the encyclopedia, a muskrat is a North American rodent that secretes a nasty pong from glands in its groin. This is presumably why the object is to prevent a muskrat population explosion. But it's not easy because a pair of muskrats are eminently capable of putting an entire warren of rabbits to shame, given half the chance. They need only pass one another casually and before you can say, 'Oh dear, it probably wasn't wise to let *that* happen,' a dozen or so baby muskrats suddenly pop up wearing nappies!

Pesky Muskrats is best described as the opposite of *Lemmings*. The aim is not to save the critters but to eradicate them as quickly as possible, by poisoning them or activating traps. There are some similarities: like lemmings, your average muskrat is about as intelligent as an educationally sub-normal carrot and it will generally plod along until it meets an obstruction. The game is entirely mouse controlled. Each of the buttons has a different



Pesky Muskrats: smelly and stupid but very good at reproducing

effect, enabling you to select bricks, bombs or poison from a menu and position them using Select. It's true that 'muskrats get everywhere' for they must be dealt with underwater, in space and among rocks and dinosaurs in prehistoric times. This three-phase theme is repeated throughout the 63 levels.

The traps are activated when you click on them and annihilate any nearby rat in a variety

of humorous ways: it could be sat on by a dinosaur, grabbed by an octopus or even vaporised by a laser gun.

Graphically, *Pesky Muskrats* is very good, even though only half the screen is used as the playing area. It's great fun to play but more than three sets of scenery would have been nice. The amount of disc swapping and waiting in between games annoyed me

intensely. After three tries at a level you must swap discs twice and wait for over a minute. I calculated that I swapped discs nearly 250 times for this review!

There are certainly areas where *Pesky Muskrats* lets itself down but overall there is just enough challenge and playability to make a worthwhile game.

Sam Greenhill

GRIEVOUS BODILY 'ARM

The Fourth Dimension.

Tel: (0742) 700661

All Risc OS machines

£21.23 plus VAT

As groans provoked by the shamelessly punning title subsided, I found this was really rather fun, in a mindlessly violent sort of a way. Your character has the attitude problem of Mr T with the fighting ability of Bruce Lee and he's a man with a mission – to beat everyone senseless. You do this while strolling through a wide variety of scenarios, ranging from an office block to an industrial complex, picking up weapons as you go.

It's not all that easy though, as you have to deal with assorted burly thugs who look intent on scooping out your head and using it as a fish-

bowl. I encountered 'lady whiplash', who possesses a fully functional whip and a breed of psychotic cat which will fly at you, claws and teeth bared. The RSPCA might not like that bit very much.

Your muscle-man is also credited with some intelligence and must work out how to get out of various tricky situations. The game constantly catches you off guard though; just as you're grappling with a logical puzzle, which depends on split second timing and precision of movement, a large rotating saw will whizz between your ankles.

This game really does have the frenetic atmosphere of an arcade 'Beat'em up'. This is achieved by using 16 colour graphics and an almost constant animation rate of 50 frames per second, even with several adversaries on screen simultaneously. The advantage



Grievous Bodily 'Arm indulging in some mindless violence

of using fewer colours, combined with areas of unblemished wall space is that they have been enormously compressed onto the two discs, providing an astonishingly large area to explore. The cartoon-like backdrops are detailed and humorous too,

giving the best of both worlds. As well as all this, there is a large sampled repertoire of crystal-clear grunts, crashes and plaintive miaows, which all add to the violent ambience – truly a game to play through a stereo!

Mat Tizard

NEXT MONTH

BBC
ACORN USER

WIN THE ULTIMATE DTP SYSTEM

This is your chance to win a unique Archimedes-based desktop publishing system. We have put together a special system featuring an Acorn A5000, LaserDirect printer, image scanner and *Impression 2* DTP software. Don't miss your chance to win it!

REPLAY v QUICKTIME

Multimedia is the future and Acorn and Apple have each entered the fray with their own systems – Replay and QuickTime respectively. We take a close look at the pros and cons of each system and weigh up the educational applications

A5000 FONTS

You may be happy with the fonts on your A5000, but we have some useful hints and tips on how to customise them to best effect

DON'T MISS

the July issue of BAU
out Thursday June 11

PLUS

STEPPING UP TO IMPRESSION

We conclude our two-part article on using this top-selling DTP package by showing how to prepare files for sending to a print bureau

WIRED FOR SOUND

If you want to get the best sound out of your Archimedes, don't miss the second part of our sound series, which looks at volume and pitch envelopes and how to produce a better synthesis routine

PRES MODULE EXPANSION

If you want to expand your A3000, Pres has come up with a podule expansion designed to do the job. We connect it up to see how it works

REGULARS

- All the latest news and views from the world of Acorn
- ★INFO – helpful advice and ideas covering the BBC A3000, Archimedes, A5000, BBC B and Master
- Your letters and problems
- Programs galore on the yellow pages and much more

To be sure of your copy, please fill in the coupon below and hand it to your newsagent. Or why not take out a subscription, which includes a free monthly disc? See page 89 for details

DEAR NEWSAGENT, PLEASE ORDER MY REGULAR COPY OF BBC ACORN USER

YOUR NAME _____

ADDRESS _____

BBC Acorn User is published by Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.
Distributed by BBC Frontline, Park House, 117 Park Road, Peterborough

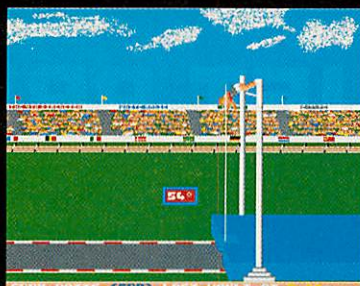
The Custom McCoy

EXCLUSIVE Mail Order Promotion Ends 31st May '92

The following Fourth Dimension software is compatible with the Acorn A3000, A5000 and ALL Archimedes computers



White Magic 1 or 2 £19.95



The Olympics £19.95



Boogie Buggy £24.95

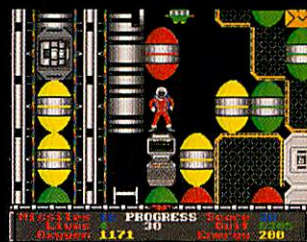


Chocks Away Extra Missions £19.95



Arcade Soccer £19.95

**Choose ANY Four
Of These 18 Top Products
For ONLY £34.50!
Less Than £9 Each!!**



Pysanki £19.95



Powerband £24.95



ARcticate £24.95



ARctist £24.95



Apocalypse £29.95



U.I.M. £29.95

**Limited EXCLUSIVE Direct
Mail Order PROMOTION**

Unbeatable Value

The Real McCoy compilations are terrific value for money. Unfortunately if you've already got 1 or 2 of the products you miss out. Now that's all changed. You can choose ANY 4 from these 18 great titles for yourself!! Each such "Custom McCoy" will be individually packaged in 1 attractive video-style box complete with ALL original discs and manuals. PLUS a unique 4D games demo disc will be sent FREE with all orders.

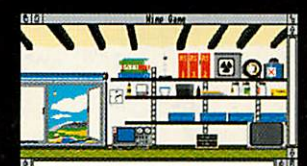
HOW TO ORDER...Ends 31st May

Simply send us a quick letter or give us a ring telling us the 4 products you would like, your name and address, and payment via cheque, postal order or ACCESS or VISA card details.

The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU.

Tel. (0742) 700661 or 769950

FREE SAME DAY despatch by 1ST CLASS POST



The Wimp Game £19.95



Man-At-Arms £19.95



Holed Out £19.95



Inertia £19.95



Nevryon £19.95



E-Type £19.95



Dropship £19.95

COLOURJET 132

COLOUR INK JET PRINTER

Compatible with:—

IBM pc
Archimedes
Nimbus
BBC Micro
Amiga
Apple Mac
(serial version)

LOW COST
LIST PRICE
from £579 + VAT



Low
Operating
Cost

Windows 3
Driver
Available



EMULATES OTHER COLOUR PRINTERS EG. IBM 3852, Canon PJ1080A, Quadjet
PRINTS OVERHEAD TRANSPARENCIES

EDUCATIONAL DISCOUNTS AVAILABLE

INTEGREX LTD., CHURCH GRESLEY, SWADLINCOTE
DERBYS DE11 9PT
Tel (0283) 551551
Fax (0283) 550325
T/x 341727 INTEGEX



SOFTWARE SHOWCASE

EDUCATION

CYBER TECH Jr

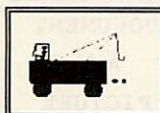
Software Systems

Junior Sheet is a NEW spread sheet package, that has been designed in association with Brinton School of Hartlepool, and thus meets the needs of the National Curriculum, as well as the

- Easy to use and mastered (RISCOS)
- Unique custom menus
- Data Base Functions, Sort etc.
- Over 30 maths functions
- Column widths dragged to size
- Many block functions
- Quickly Produces Pie Charts etc.
- 'Hot Linked' Graphs
- Saves ASCII, CSV, TAB, iDraw
- Variable Sheet Size
- Utilises RISC-OS printer drivers
- Updates available
- £35 single user licence

10 Penarth Walk, Hartlepool, Cleveland. TS26 0TW (0429) 267511

Simple solutions to educational problems.
Software designed for the primary classroom.
Sensible, no-nonsense programs, which can be used in the school by the children.



My words!
spelling game
£29.99



Simple charts
£9.99



Shapes
£9.99
tessellations using 'gummed shapes'

All prices include VAT, postage and packing. For more information or to order any of the above please write to:
Giant Ape Software,
9 Elgar Close, New Street, Ledbury,
Herefordshire, HR8 2DF, England.

The convenient SINGLE SOURCE for Educational Software

- All popular educational programs available at publishers prices or below including Mirasoft, 4 Motion, Sherston, Resource, E.S.M. Chalksoft, Macmillan, Bourne and over 50 other publishers.
- Wide range of formats: Not only BBC, Archimedes, Nimbus, but also a wide selection of programs for Spectrum +2/+3, Amstrad, Nimbus, Commodore 64/Amiga, Atari ST, IBM-PC and others!
- Vast stocks: 30,000 programs always available for immediate delivery.
- Unconditional guarantee: problems rectified by expert staff - telephone helpline also available.

THE EDUCATIONAL SOFTWARE DIRECTORY
describes and prices hundreds of program

Write or phone for a free copy:

RICKITT EDUCATIONAL MEDIA
FREEPOST - Ilton - Ilminster - Somerset TA19 9HS
Telephone 0460 57152 - Fax 0460 53176

Please state the ages of your children and make of your computers

SCOTTISH SCHOOLS EQUIPMENT RESEARCH CENTRE

ONLY £12+VAT
A series of simple guides
for all users of iDraw

iDRAW PRACTICAL GUIDES
by George V. Thompson

General Information
The Menu System
Using text areas from iEdit
Grouped objects & Justify
Hints & Tips for working
Using libraries of objects
Using the Grid system

From the publishers of the **GRAPHICS LIBRARIES**
100 pages, A4, loose leaf, ready to go in folders.
Get the most out of iDraw for minimal cost!
Includes 2 discs of exercises shown in the guide.
Contact SSERC, 24 Bernard Terrace, Edinburgh EH8 9NX

EDUCATION

Make the most of your Archimedes/A3000 with a unique package for primary schools,

"Picture It!"

a unique software package specially designed as an aid to the National Curriculum.

"Picture It!" allows children to build up scenes using sets of simple pictures, linked to specific topics currently including History, Geography, Maths, Science, R.E and Design and Technology.

It is exceptionally easy to use, making it an invaluable classroom resource, ideal for younger pupils or those with special needs.

For further information please contact:

Applan Way Software Ltd.,
Old Co-operative Buildings,
Langley Park,
Durham, DH7 9XE.
Tel: 091-373 1389

NORTHERN MICROMEDIA

*Quality educational software and resources
developed by teachers for the classroom*

For further information contact:
NORICC - Resources Centre - Coach Lane Campus
Coach Lane - Newcastle upon Tyne NE7 7XA
Telephone: 091 270 0424



MEWsoft Diet Manager II

- > A unique multi-tasking application designed to help you manage your diet.
- > Simply drag food from The Larder onto The Tray.
- > See the nutrient information (Calories, proteins, carbohydrates, fats and fibre) in numerical and graphical form, including percentage of target. (Targets (RDI) can be set to your individual requirements).
- > Single foods or complete meals can be analysed with Bar and Pie Charts.
- > The database comes with over 200 foods and new foods can be added.

"Brilliant! An ideal application for a computer. Well executed" *Micro User*
"A very good program" *Acorn User*

£35 inc p&p

Also from MEWsoft Forms Suite II

An easy to use RISCOS multitasking application for the design of Forms with lines, boxes, grids etc.
Used in hundreds of schools.
Ideal for registers, mark sheets, checklists etc.

£35

MEWsoft
11 Cressy Road
Hampstead
London
NW3 2NB
Tel: 071 267 2642
Fax: 071 482 6452

SPECIAL NEEDS

C.J. COMPUTING SPECIAL NEEDS

SALES · REPAIRS · SPECIAL NEEDS

Please contact us for all your Acorn computers (Hardware & Peripherals)

We specialise in tailoring computer systems for special needs

**57 Westbury Hill,
Westbury-on-Trym,
Bristol**

Tel: (0272) 624553

!!VARIOUS!!

ROOM 7 SOFTWARE

**ELECTRONIC
HOBBYIST**
£22.99

**CENTRAL
HEATING
CALCULATOR**
£23.50

**POCKET
ENGINEER**
£34.50

**INVESTMENT
ANALYSER 2**
£19.98

INFLATE
£19.98

**SEE US AT
NORTHERN
COMPUTER
MARKET**

Our catalogue contains full details of these and other programs for Acorn computers. Prices include postage and V.A.T. at 17.5%

Most of our programs are available for the Electron/BBC B/B+Master, COMPACT and ARCHIMEDES range on 5.25" and 3.5" discs.

Letters/cheques to:
W.L. COMPUTER SERVICES,
Dept. 2, First floor, H.S.L. Building, 437 Warrington Road, Rainhill,
Merseyside L35 4LL. Tel: 051-426 7400 Fax: 051-493 1425

EDUCATION

Educational Software

A3000 / BBC / Acorn

Send for our free catalogue of programs for all Acorn computers. Ages 5 to 15

SELECTIVE SOFTWARE

**64 Brooks Road,
STREET, Somerset, BA16 0PP**
Tel. (0458) 43079

"WEATHERMAN" Age 5-9 years
really SATisfying new software
for the Archimedes/A3000/A5000!
Send for a free catalogue to:
**H.S. Software, Freeport, Swansea,
SA2 9ZZ Tel: (0792) 204519**



rain snow storms sun clouds sleet fog temperature
10°C 30°C
0°C 30°C

LANGUAGES

KEYLINK PROLOG V2.0 For the Archimedes

- Uses standard Edinburgh syntax.
- Comes with 120 page tutorial/manual developed especially for the first time Prolog user.
- Fully integrated into the RISCOS WIMP environment.
- Suitable for use with large Prolog programs such as the Open University's public domain MIKE system for Knowledge Engineering and Expert System development making it ideal for these components of A' level syllabuses.

£69.95 + VAT (postage included).

Keylink Computers Ltd, 2 Woodway House, Common Lane, Kenilworth CV8 2ES. Tel/Fax: 0926 50909

STATISTICS

STATISTICS

The ESTABLISHED system
for the Acorn Archimedes is

FIRST

Write or telephone for details to

SERIOUS STATISTICAL SOFTWARE

Lynwood, Benty Heath Lane, Willaston

South Wirral L64 1SD

Tel: 051-327 4268

NEW lower cost

FIRST JR
now available

SOFTWARE SHOWCASE

PUBLIC DOMAIN

NEW

Making its premiere this month on the brand new Skyfall Spring '92 Demo Disc is the Revolutionary Interactive 'What you See, is What you Get' Database. For the first time ever you can graphically see the contents of our great discs before you buy, with a detailed description for every Application, Demo and Game.

Skyfall

Please send £1 for your copy of the Spring '92 Demo Disc and Catalogue.

Skyfall, PO Box 2220,
BIRMINGHAM, B47 5RZ.



PUBLIC DOMAIN

Arch Angel

The PD Library

Over 500 discs of the best Archimedes P.D. Software. Unlike other libraries you can pick 'n mix the programs you want. Just £1.20 per disc for our own compiled discs or £1.60 for the pick 'n mix service.

Choose from any of our best sellers for £1.20 each or take all 16 for only £16 (including P&P and latest catalogue!)

B01 - Hyperbase	J02 - Circuit analysis
D12 - Queen Demo	L09 - Dungeon Quest
D27 - BIA MegaDemo	M29 - Maestro Tunes
D43 - Gym Animation	N02 - Best soundtrackers
D49 - Armageddon demo	R01 - Disc utilities
D54 - RISC Dream demo	T01 - Sillyies
E01 - European database	U12 - Anagram finder
H01 - Home management	X01 - Programming Utils

Take advantage of the special offer above or send £1 for the latest catalogue with unique 'Pick n Mix' feature.
Arch Angel PD, PO Box 41, Exeter, Devon, EX4 3EN.
Please make any cheques payable to Arch Angel PD.

MUSIC

!NEW!

SOUND-SAMPLING SERVICE

Send an audio cassette with music or sounds recorded on it, stating your Archimedes computer memory (1/2/4Mb) Approx. one minute of the music/sounds will be sampled on to a disc and returned to you with a Player Application.

ALL AUDIO CASSETTES RETURNED

Enclose £4 Cheque/PO made payable to N.J. Maltby, send to:-

The Sound-Sampling Service

Tel: 0788 890708

8 Mill Close

(After 4pm Mon-Fri)

Braunston Daventry

Ask for The Sound-Sampling Service

Northants NN11 7HY

ONE TAPE PER ORDER* *UK ONLY

!HURRY! First 15 customers get 25% off next order!

SCANNING SERVICES

HOBBYIST

DOCUMENT

DTP

AND

FUN

PICTURE

BUSINESS

SCANNING



DTP-Scan

HIGH QUALITY COLOUR & B/W SCANNING

FOR ALL ARCHIMEDES USERS INC. A5000

AT SENSIBLE PRICES

ONLY £4.60 FOR 6"x4" COLOUR PICTURE

INC. DISC AND RETURN POSTAGE

*** UP TO A4 SIZE * UP TO 400 DPI ***

Call 061-445 0191 for Free Information Pack
Or send Picture/Document with instructions to:

DTP-Scan 27 Broad Oak Lane
East Didsbury Manchester M20 0QB

BUSY BEE

5 PD DISCS £5.00.

DEMO No.3, PD. & CATALOGUE DISC. £1

Special offers on Archimedes software including Educational now available.

Fun School 3 £21.50, Freddy Teddy 3-7 £20, Spell Week/Week 6-14 £21.95, Imagine £36.95. Tiny Logo/Tiny Draw £31.75, Magpie £45.80.

Air Supremacy £20.50, All In Boxing £12.95, Lemmings £22.99, Manchester United £22.99. Articulate £20.50, Chuck Rock ONLY £22.99, Elite £37.50, The Real McCoy 1 & 2 £24.50 EACH.



BLANK DISCS 3.5" DS/DD.
(BRANDED)
10 for £7 or 25 for £17.

Prices quoted include VAT & Del. UK.

Delivery Europe £2.50. Rest of the world £4.50

PO/Cheques to:- **BUSY BEE COMPUTERS LTD.**
4 Whitetails Drive, Ormskirk, Lancs L39 3QR.

Tel: 0695 573825

Moribund Hedgehog PD

3 Rodmell Close, Bromley Cross,
Bolton BL7 9DT

When selling more than one disk, MHPD is the cheapest supplier of quality Public Domain software for the Archimedes. There's a unique 'Picked & Packed' service, and the swapping of software is welcome.

Send £1 now for the latest Demo Disk (including the acclaimed disk-based catalogue, with a megabyte of useful and entertaining software, including the official MHPD demo). For a limited period, you'll also get a 50p-off voucher.

The Datafile on page 53 of this issue of Acorn User.
The Archimedes PD & Shareware Library
For details of our latest **Public Domain & Shareware at prices you can afford.**
Cat/Demo disc VI that contains over 1625k of archived public domain software.
All discs £1.75 and the comprehensive 500k Cat-a-log please see our main advert
Send your discs to us 75p.

PROGRAMMING

Reviews

SPECIAL OFFERS

EXCITING NEW DISK BASED MAGAZINE
POWER TO THE PROGRAMMERS

Refreshes the parts other magazines cannot reach!

LEARN HOW TO WRITE YOUR OWN GAMES FROM THE PROFESSIONALS

Have a say in future Archimedes games
Get your FREE copy now

Simply send £1 coin to cover disk, duplication and P&P

To: **COIN-AGE LTD.**
1st Floor, 23 COOPER ST., NELSON, LANCs. BB9 7XW
and give some **POWER TO THE PROGRAMMERS**
1st issue available NOW!

TIPS

Cheats

NEWS

ARCHIMEDES PUBLIC DOMAIN

LOWCOST = THE BEST NAME IN PD

SEND for LOWCOST PD's latest catalogue/demo disc. It contains full details of all our exciting £1 discs. YES, JUST £1 a disc!

Nothing but the BEST at LOWCOST PD!

Please send a £1 coin or £1 cheque made payable to J. Michalski for our catalogue/demo disc to:

LOWCOST PD (LC PD), 6 FURZELAND HOUSE,
SHEEPHOUSE WAY, NEW MALDEN, SURREY, KT3 5PH.

SOFTWARE SHOWCASE

UTILITIES

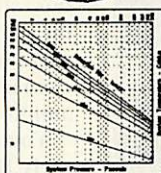
!DrawAid

Produce !Draw files as varied as these from your own BASIC programs.

!DrawAid comes with an Introductory Tutorial, a Reference Guide, and numerous Example Programs.

PRICE £10 including postage, no VAT or send SAE for information sheet.

CARVIC Manufacturing,
Moray Park, Findhorn Road,
FORRES, Moray IV36 0TP



ACCOUNTANCY

Kendal Computer Centre

68 Stramongate, Kendal, Cumbria, LA9 4BD

ARCOUNTS MANAGER THE ULTIMATE ACCOUNTS PACKAGE

The most highly featured package on the market, fully supported, demo available call/write for details

(0539) 722559

GAMES

✓✓✓✓ CHECK OUT THESE PRICES ✓✓✓✓

Aggressor	£16.95	Enter the Realm	£20.95
GB ARM	£20.95	Cataclysm	£20.95
S.W.I.V.	£21.95	Air Supremacy	£20.95
X-Fire	£20.95	Lemmings	£21.95
Wonderland	£30.00	COPS	£19.95
Creator	£38.95	Creator Support	£19.95
ALPS	£34.95	ALPS Support	£19.95
UltraSonic	£30.00	Plague Planet	£14.95
Atelier	£84.00		

Please phone for a quote on any software or hardware not listed here

Please add P&P: UK £1.00, Europe £2.50, Outside Europe £4.50

ALPINE SOFTWARE, Dept (BAU8) Tel: 0762 342510
PO BOX 25, Portadown, CRAIGAVON, BT63 5UT

MAGAZINES

42 Wimborne Gardens, Ealing, London, W13 8BZ.

Illusions Archimedes Disc Magazine

Illusions Disc Magazine will appeal to everyone with its highly informative articles on games, major software packages, developments in the Acorn world, hints & tips and much more. Illusions comes on 3 discs: 1 magazine disc plus 2 discs full of the latest P.D. software. If you want to utilise the immense power of your Archimedes computer, order Illusions.

*** Sample issue only 89p ***

Please make all Cheques & POs payable to 'John Reed'.
Prices: Each issue costs £3, buy 5 issues (£15) and get 1 free!

DTP

Demonstrations of Desk Top Publishing on Acorn A5000 and BBC A3000 We also offer

Sound Practical Advice - Demo's Daytime, Evenings and Weekend

Hardware Sales - 0% Finance on Learning Curves

Academic's - Teacher's - Student's Purchase Scheme

Technical Support - Home Tuition - Software Sales

High Definition Scanning and Printing Service Available

SELECTIVE COMPUTER SERVICES Acorn Approved Telephone Derby (0332) 690691
LICENSED CREDIT BROKER

ACORN USER ADVERTISEMENT PAGES - JUNE 1992

4-Mation	66	Dabhand Computing	110-111	Longman Logotron	11	SSERC Graphics Library	117
4th Dimension	69,115	Dabs Press	62			Superior Software	0BC
Ace Computing	100	Datafile	53,118	M.E.C.	119		
Advanced Computer Services	106	Dec Data	32	Manor Court Supplies	73	T.M.J. Computer Software	76
Alpine Software	119	Design Concept	98	MEWsoft	117	Technomatic	24-25
Ampsound	33	Desktop Projects Ltd	51	Michalski	118	Terrell Electronics	106
Appian Way	117	Digital Services Ltd	14	Micro Aid	53	The Data Store	76
Arch Angel	118	DTP Scan	118	Micro Discount	33	The Serial Port	48
Atomwide Ltd.	26			Micro Studio	33	The Sound Sampling Service	118
Automatic Services	32	Electronic Font Foundry	94	Microboss	52	Timestep Weather Systems	33
AVP Computing	52	Explan	73	Minerva Software	105	Turing Tools	106
				Moribund Hedgehog PD	118		
BBC Acorn User Show	64	Fact Systems Ltd.	98	Morley Electronics	17	Unique Way	90
Birdtech	118						
Broad Oak Computers	33	Giant Ape Software	117	Northern Micromedia	117	Warehouse	90
Busy Bee Computers	118	Gnome Computers	73	Norwich Computer Services	53	Watford Electronics	34-46
BV Computer Maintenance	33	Ground Control	100			We Serve	98
				Oak Solutions	20-21	Willow Software	76
Carvic Manufacturing	119	HCCS Associates	IBC			WL Computer House	117
CJ Computers	119	HS Software	117	Redwood Publishing vacancy	88		
CJE Micros	IFC			Rickett Educational Media	117		
Clares Micro Supplies	60	ICS	1,4-5,6,88	Risc Developments	8,12,90		
Coin Age	118	IFEL	32				
Colton Software	2	Illusions Magazine	119	Selective Software	117		
Computer Concepts	31,102	Integrex	116	Selective Computer Services	119		
Contex Computing	32	Intelligent Interfaces	88	Senlac Computing	52		
Cybertech Software	117			Serious Statistical Software	117		
		Kendal Computer Centre	119	Skyfall	118		
D.T. Software	56	Keylink Computers	117	Software Bargains	86		

STAR LETTER £15

I have just picked up a Macintosh Powerbook brochure from my friendly Mac dealer in Exeter. I sighed, almost cried, 'that's just what I need at the moment in time'. A professional handy and useful notebook computer that I can take with me to work and take home again.

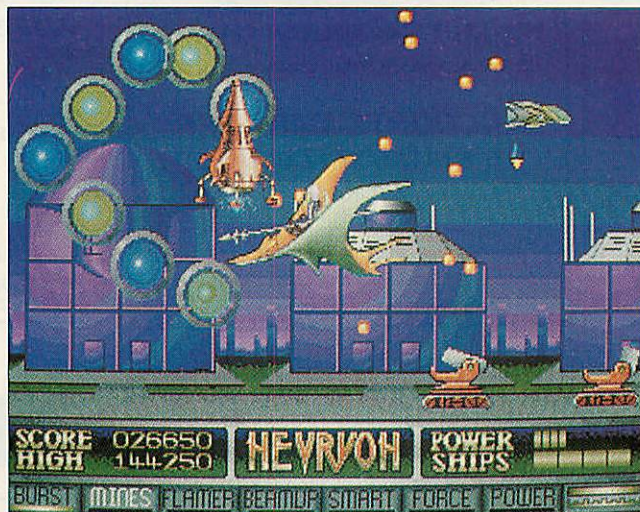
But wait, I use an Archimedes, I bring my work home to do in the evenings and even sometimes take my system apart and transport it to work. Then after my day in the office, take it apart again and take it home! Hang on a minute, what am I doing? Why don't I just get rid of my Archimedes, get a Mac for home and buy one of those marvellous Powerbooks and be able to have computing on the move?

Since I purchased my Archimedes, when the system was first introduced onto the market, I have had nothing but praise for it. In fact what I have found is that I am spending most of my conversations with computer dealers and Windows freaks carrying out Acorn's PR for them!

Where are all the Archimedes advertisements? Why do PC enthusiasts not even know about the Archimedes? Where is the Archimedes notebook computer? Where is 24-bit colour?

Acorn are playing the selling game in a strange manner. You only get sales and profits up by having a good product, which they have. However it also has to be marketed correctly. I feel that relying solely on the education market and not attacking the business market, Acorn have missed a golden chance. No adverts in the IBM PC magazines, no business-related products like a notebook. Am I stuck with just a home computer with a limited future?

Most of these comments have been made before by other people but where is Acorn? Companies like Computer Concepts, and magazines like *BBC Acorn User* have actually done the job of selling the Acorn Archimedes.



Nevryon, are the big bad baddies bad enough for you?

So what do I do? Do I battle on with my Archimedes while the rest of the world accelerates with Notebooks, 24-bit colour, Windows 3.1 (which is bad, but PC owners know no different, do they Acorn?) Or do I get rid of my Archimedes and buy a Mac Powerbook and take a step into the real world? Do I have a choice, Acorn?

Ian Kingston
Crewkerne
Somerset

All sources from Acorn point to the portable launch being not far away. Sam Wauchope, Managing Director of Acorn Computers Ltd said to BBC Acorn User last month that the laptop would 'be seen publicly within the next two or three months'.

And recently at the Which Computer Show, Acorn took a step away from education. Their stand was devoted entirely to Acorn DTP solutions, with Computer Concepts and EFF showing their products on the Acorn desktop publishing system.

MOVE THOSE SPRITES

I own a BBC A3000 and have at home a couple of shoot-em-up games.

I wish to make out a point for future shoot-em-up games authors. Most of the games produced are *R-Type* clones, but why is it not possible to make a real *R-Type* game? If it were possible, I would urge Krisalis to convert one for the Archimedes, especially if it was *R-Type 2*.

What I really mean is that most games do not contain the real arcade flavouring. For example, when one meets a gruesome alien which guards a door to the next battle zone why does it seem that it is rusted and only able to shoot from one point?

In *R-Type 2* the aliens are dangerously tricky, being able to move and have multiple firing systems. Also they have some kind of intelligence as they are able to corner you and blast the living daylights out of your ship. So come on, you games programmers, get some real movement into those monsters.

Daniel Zerafa
Ghajn Sielem
Gozo

Watch out for *Scorpius*, coming soon from Arxe Systems. From the way the rumours are buzzing it sounds like quite some shoot-em up.

VARIABLE VOLUME

Is it possible to make the sound on a BBC any louder than it is with the -15 setting in the SOUND command, and does it involve soldering?

Richard Keeble
Epsom
Surrey

If your BBC Model B is not loud enough already, then it probably means that the internal volume isn't set to full power.

If you take the top off your Model B and trace the wires from the speaker to their source, just left of the socket

is a small variable resistor marked VR1. While holding down CTRL-G use a small screwdriver to turn this clockwise until the desired volume level is reached. If this still isn't loud enough then you can always run the wires out of the machine and connect them to a small amplifier.

You can also pick up some early Beebs and Electrons on AM radio with a bit of fiddling with the tuning knob, so your Beeb might be able to produce sound at some wattage from a standard home Hi-Fi without opening the case.

FILECORE FIX

I was reading the Questions and Answers section, *BAU* April '92, and M. Dunkin of Lincoln wrote in asking for a remedy for the dreaded 'Filecore in Use' error. He was told to dismount discs. This does work, although it will not when you are actually given the error on screen.

Also he said that he is using a lot of discs at once, so dismounting them will not stop him from needing them.

There is a more effective way of killing the error when you are actually given it, and you will not need to dismount your discs. When you get the error do the following:

First of all Press F12, this may give you the error 'ShellCLI Task Still Active'. If so then you will have to type the following commands into the New Task box, accessible from the Task Manager Icon.

Type the command `RMKill Filecore%adfs` and press RETURN. Then type `RMReinit adfs` and press RETURN twice.

You will now be able to use the filing system again.

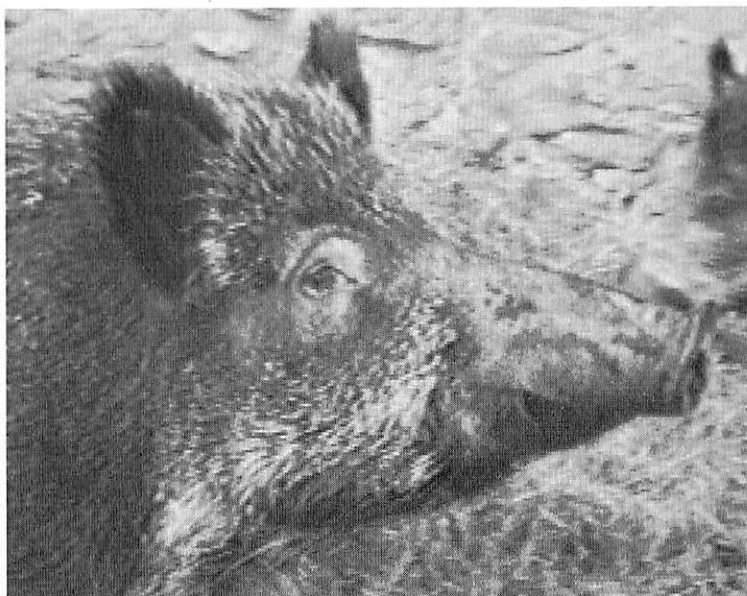
Miles Carter
Chandlers Ford
Hampshire

Although this temporarily stops the error it is not recommend as a permanent cure, merely a temporary fix. As pointed out in *INFO some months ago the `RMKill` and `RMReinit` commands are best used so that you can save all of your work and then reset your machine.



VISION digitiser £49

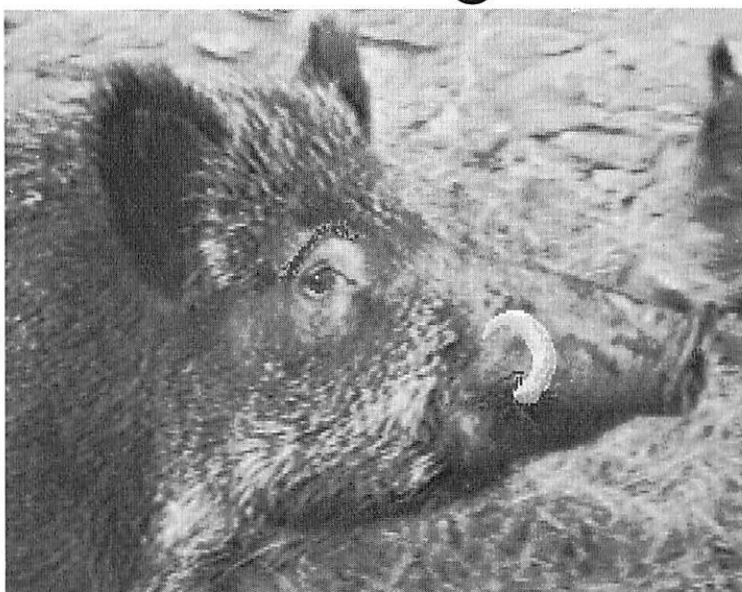
The HCCS Vision Digitiser is in effect a real time video digitiser, ie. it can digitise and store a video frame within its own period. The time taken to transport this data through the podule interface and re-organise it to fit into any one of four screen modes takes about one second. That is the preview or 'Continuous' mode. When the right picture is in frame you can freeze it and have it 'Processed', as we did with Brutus here. The enhanced



Go Wild with a Vision Digitiser!

image can then be saved in the normal Risc_OS way, and later loaded into an art package such as !Paint (bundled with every Archimedes) in order to make those small enhancements!

What do you need in order to accomplish this? Simply any standard PAL video source (we used a Canon Camcorder) and a Vision Digitiser £49 + VAT for A3000 and Archimedes. £62+VAT for A3000 External model.



TECHNICAL SPECIFICATION

- 6 Digitised bits expanded to 8
- Modes 12, 15, 20 and 21 available
- Image size of 250×640
- 256 Greyscales
- Colour Option available from June
- Risc_OS Compliant
- PAL (1V pk to pk 75 Ohms) input
- On screen Contrast and Brightness controls
- ETT (Error Transfer Technique)
- Captures image in real time
- Takes 1 sec. (A5000 0.5 sec.) approx. to display 'Continuous' image
- Takes 12 sec. (A5000 4 sec.) approx. to display 'Processed' image



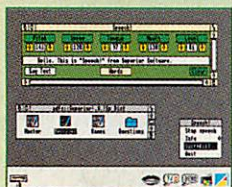
HCCS ASSOCIATES LIMITED, 575-583 DURHAM ROAD, LOW FELL, GATESHEAD, TYNE AND WEAR. NE9 5JJ. Tel: (091) 4870760 Fax: (091) 4910431

All prices excluding VAT. Postage and Packaging free. E&OE.



ACORN ARCHIMEDES TITLES FROM SUPERIOR SOFTWARE

SPEECH!



Give your computer a voice with this high quality speech synthesiser, which is both easy to use and very flexible. It can directly speak words you input or text files, or you can use phonetic input to add stress/intonation, speak foreign languages or even sing! An easily modified spelling program is included.

"For just 20 quid, Superior is offering a bargain here" ...Computer Shopper (Aug. 91)

"The most sophisticated of the speech programs" ...Special Solutions News - Acorn Computers (Autumn 91)

"Unquestionably the best buy" ...Micro User (July 91)

£19.95

AIR SUPREMACY



In this unique game, you can swap between air and ground/sea forces as the battle develops. Practise with the biplanes and tanks of 1918 Europe, the fighters and gunboats of the Pacific 1944, and the guided missile jets and desert tanks of the Gulf 1991. Then to 2150 and the final challenge!

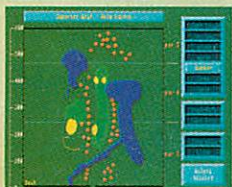
"The sense of speed when flying around is excellent. Skimming along the ground in a stealth fighter is particularly fun" ...BBC Acorn User (Dec. 91)

"The ultimate dogfighting game - will take weeks of intensive play to complete - sinks its hooks into you and doesn't let go" ...Archimedes World (Dec. 91)

£24.95

SUPERIOR GOLF

plus CONSTRUCTION SET

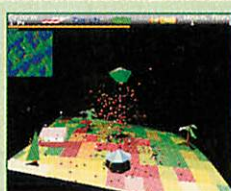


The complete golfing game for 1 to 4 players, designed exclusively for the ARCHIMEDES. Realistic gameplay with a choice of six courses (St Andrews, The Belfry, Victoria and three Sea Palms courses), plus Driving Range and Practice Green. Full feature hole and course design and editing facilities.

"Technically brilliant, graphically excellent and incredibly playable. Worth going a fairway to buy" ...A & B Computing (now Archimedes World) (Dec. 90)

£19.95

ZARCH



David Braben, co-author of ELITE, has harnessed the speed and performance of the ARCHIMEDES to create a programming masterpiece. Nerve-tangling gameplay over a massive 3-dimensional landscape, with realistic area shading and accurate perspectives. Totally addictive.

"LANDER - which is supplied with the Acorn equipment - is fun; ZARCH is a game. ZARCH has a map, it has a string of bad guys and most importantly of all it has a series of challenges that develop as you play the game. And that's what gives it the quality possessed by the greatest games" ...BBC Acorn User (Nov. 91)

£19.95

CONQUEROR



Step into a tank of your choice and experience the thrill of controlling one of the most powerful land vehicles in the world, in a 3-dimensional landscape of roads, hills, villages, rivers and woodland. Choose the Arcade or Attrition games to develop your skills, and then ultimately the Strategy game, a full battle simulation with up to 16 tanks per side from American, German or Russian forces.

"What I want is a thinking man's shoot-em-up and CONQUEROR fits that bill" ...Micro User (May 88)

"A highly addictive tank simulator" ...Learning Curve Magazine (Aug. 90)

£24.95

HOSTAGES



The highly acclaimed, top-hit ATARI/AMIGA game, now reaches the ARCHIMEDES. Commando action and strategic planning as you rescue the hostages from the besieged embassy. Brilliant, realistic graphics and exciting gameplay...superb digitised sound effects and tunes...keyboard or mouse control.

"Graphically the game is very nice indeed. Your men run around, jump, leap, roll and die with great aplomb and the animation of them is excellent" ...A & B Computing (now Archimedes World) (Dec. 90)

£19.95

REPTON 3



Four of the most popular strategy games ever produced for Acorn computers in one great value-for-money package. Four complete Repton games - REPTON 3, AROUND THE WORLD IN 40 SCREENS, THE LIFE OF REPTON and REPTON THRU TIME - with choice of four tunes and a position Save/Recall facility, plus easy-to-use screen and character design and editing facilities.

"REPTON 3 is an on-screen strategy program which children from seven upwards simply adore. No library of games software is complete without REPTON 3 - it is a must" ...BBC Acorn User (Nov. 91)

£19.95

MASTER BREAK



A snooker-style trivia quiz for 1 to 4 players. Over 2000 questions on SCIENCE & NATURE, POP MUSIC, GEOGRAPHY, SPORTS & PASTIMES, ARTS and HISTORY. Digitised pictures include: sport and pop stars, famous places, animals and world leaders. Amusing and educational. Can you get the maximum break of 147?

"The digitised pictures and sounds are very nice indeed. The timer really adds atmosphere - I panicked the first time I tried to answer a black question...it's good to play on your own or with friends" ...Micro User (Mar. 91)

£19.95

SPEECH!, HOSTAGES, MASTER BREAK and the REPTON games are also available for the BBC MICRO/MASTER and ELECTRON computers. Please write to the address below or telephone for a full list of our BBC MICRO/MASTER (including MASTER COMPACT) and ELECTRON titles.



ACORNSOFT

(Superior Software is a trading name of Superior Microcomputing Ltd.)

Dept. F, P.O. Box 6, Brigg, S. Humberside DN20 9NH. Tel: (0652) 658585

PLEASE MAKE CHEQUES PAYABLE TO "SUPERIOR SOFTWARE."



24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched by first-class post
- Postage and packing is free
- Cassettes and disks that are faulty on receipt will be replaced immediately

(This does not affect your statutory rights)